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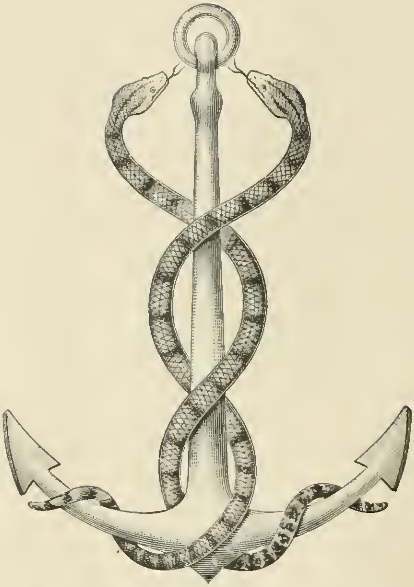

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THE
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ALEXIS THOMSON, M.D., F.R.C.S.Ed.

AND

HARVEY LITTLEJOHN, M.B., F.R.C.S.Ed.

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ORIGINAL ARTICLES.

PAGE

CHIENE, GEORGE L., Notes on a Case of Strangulated Hernia in which Two Loops of Small Intestine were involved 252

CROOM, DAVID H., The Therapeutic Value of Formic Acid in Diphtheria . 337

CROOM, Sir HALLIDAY, The Times of Harvey 9

DE MERIC, H., Some Points in the Internal Treatment of Gonorrhœa . 530

DICKINSON-LEIGH, J., A Medico-Legal Case 253

DUCKWORTH, Sir DYCE, The Dignity of Medicine 485

EWART, WILLIAM, An Introduction to the Clinical Study of Vascular Disease 199

FENWICK, W. SOLTAU, Displacements of the Stomach, and their Effects upon Digestion 395

FLEMING, R. A., Personal Experience of Poisoning by Charcoal Fumes . 248

FOWLER, J. S., A Case of Infantile Myxœdema: Anomalous Result of Treatment. (Plate III.) 432

HALDANE, P. S., A Special Consideration of the so-called "Pancreatic Reaction" 418

HERRINGHAM, W. P., On the Prognosis of Chronic Nephritis in the Young . 24

JOHNSTONE, R. W., Pentosuria, Chronic and Alimentary . . . 138

KER, CLAUDE B., Antisepsis and Asepsis in the Treatment of Enteric Fever . 29

MEIKLE, J. HALLY, Persistence of Bacilli in the Throats of Convalescent Diphtheria Patients: A Clinical and Bacteriological Study of Three Hundred Cases 510

MELVILLE, H. G., Ovary Free in the Pelvic Cavity 250

,, Primary Broncho-Pneumonia in Adults . . . 497

MILES, ALEXANDER, Observations on Perforated Gastric and Duodenal Ulcer, based on a Personal Experience of Forty-six Cases operated upon 106, 223

NICHOLSON, H. OLIPHANT, Some of the Physiological Changes in the Maternal Organism during Pregnancy, and their Significance . . 123

PAGE

Oliver, James, Is there a Decidua Reflexa? 135

Potts, W. A., The Feeding of Young Children 333

Primrose, A., Blastomycosis of the Skin in Man. (Plates I. and II.) . 215

Raw, Nathan, The Mental Disorders of Pregnancy and the Puerperal Period 118

Robin, Albert, An Introductory Lecture delivered at the Inauguration of the Chair of Clinical Therapeutics, Faculty of Medicine, Paris . . 46

Sherren, J., Some Points in the Surgery of the Peripheral Nerves . . 297

Stockman, Ralph, The Formation and Action of Salicyluric Acid in the Human Body 103

,, The Value of Sodium Salicylate in Scarlatinal Arthritis and other Joint Infections 244

Struthers, J. W., Spinal Anæsthesia, its Advantages and Disadvantages . 439

Turner, A. Logan, Three Cases of Acute Suppuration in the Maxillary Antrum treated by washing through the Nasal Cavity . . . 152

Wilkinson, George, The Use of the Double-Wedge Splint in Treatment of Fractures of the Humerus 148

Woodward, Chad, The Treatment of Scoliosis by Dr. Klapp's System of Exercises: A Résumé 59

THE

EDINBURGH MEDICAL JOURNAL.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

Russell of Glasgow.

A GREAT deal of what was best in the life and thought of Dr. Russell is embraced in Dr. Chalmers' volume,[1] and of the list of eighty published papers which it contains it is certain that every paper of the eighty is worth reading. The task of the editor must have been a difficult one. For Dr. Russell's official life in Glasgow covered the long period of twenty-six years, and these the most progressive years in the public health life of our greatest Scotch city. Dr. Russell was a personality of a very unusual type. He had the sensibility of the man of letters, the impulse of the administrator, the outlook of the social philosopher, the intensity of the preacher. In his ethics he was a perfectionist. He did much, he was always finding things to do, and what he did, he did with his might. He began no task with a light heart. He took everything with uncompromising seriousness. It was natural therefore that he should have poured forth a series of papers that expressed all the high qualities of his personality. If any man ever left his mark on a great city, Russell left his mark on Glasgow. Over the whole world of public health he was known as Russell of Glasgow. He made Glasgow known as the leading city of sanitation. To classify the products of such a man was a difficult task, the editor being faced with the alternative—Shall I merely reprint the articles, or shall I endeavour to make them tell the history of the generation that produced them? He has chosen the latter alternative. He has classified his masses of material into chapters, partly historical, partly sociological, partly statistical, partly clinical. By this arrangement, it is true, we miss something of the unity of particular productions, like the "Evolution of the Public Health Function"; but the materials are all there, and on the whole the reclassification is justified.

How did Dr. Russell succeed in producing so powerful an impression? He shrank from public life; he was never too robust in health; he hid himself away from the open turmoil of social distraction, of controversy, of politics. No man sought less the public eye; no man exploited less the ordinary means of social succcss; no man hated more the trivialities that fill the day of the ordinary citizen. Nevertheless, he lived in a blaze of publicity; he did things that were original, fruitful, and provocative of labour in others. He based all his work on solid careful analysis and research, and all his work has the actuality due to his method. At close quarters, he was a man full of imagination, ideas, witty inventions, happy phrases, pointed allusions, keen characterisations of persons, denunciations of sham, splendid indignations, sensitive sympathies, and an unremitting sense of honour and justice.

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[1] "Public Health Administration in Glasgow": A Memorial Volume of the Writings of James Burn Russell, B.A., M.D., LL.D. Edited by A. K. Chalmers, M.D. Glasgow, James Maclehose & Sons. 1905.

There were few that ever obtained his confidence; but their privilege was great. His contemporaries in the profession speak of him with a reverence that only high character ever evokes. In Glasgow, this vast turgid market-place of industrial forces, he felt the stirring of great movements; in imagination he saw them ripening, and he seemed to realise them with the intensity of vision that marks the prophet. He stirred alike zeal in the laymen of his circle, in his pupils, in his professional friends. But through all the fine frenzy of social emotion he worked like a slave at the details of his daily task. Whether it was the digesting of new statistics, or the framing of a diplomatic letter, or the fighting of a case in Court, or the disciplining of a subordinate official, or the preparation of a daily report,—it was all done in the same intense spirit. That is why this volume contains so many classics of sanitary history. It will rank with Simon's "Sanitary Institutions," Farr's "Vital Statistics," Chadwick's "Health of Nations," and the other great realities of health history in the British Empire.

Russell's work at the Local Government Board is not here touched upon. He is here Russell of Glasgow. Naturally, his official doings as a member of the Board could not attain to the same form of expression as his work in Glasgow; but as a member of the Board he was able to give to Scotland what he had learned. in Glasgow. He made all Scotland feel the same strenuousness of executive as he had made familiar in his native city. To those that know his work nothing is more striking than the change of tone that always followed Dr. Russell's initiative. But he came to his work in Edinburgh when he was already an old man, "made weak by time and fate, but strong in will." The closing months of his life were one prolonged heroic struggle against physical agony. Yet he worked at high pressure until he came within thirty-six hours of his death. It is difficult to imagine greater intensity of character, greater heroism against physical torture, greater devotion to the ideal of a perfect life.

The admirable portrait which has been reproduced shows Dr.

Russell in the reflective attitude not uncommon to him. The look is sad, the countenance grave, the whole attitude serious and impressive. It is a true portrait. But there are others equally true, where a smile of the most charming humour sparkles in his eyes, and the gay side of his nature reveals itself. Perhaps the portrait selected here better fits the tone of his permanent message to the world, which, in untold and in unnumbered ways, is the better for his having lived in it.

Insanity in Scotland in 1904.

The Forty-seventh Annual Report of the Scottish Commissioners in Lunacy, giving statistics for the year 1904, is on the usual lines of such documents, and, as is to be expected, gives much useful and interesting information regarding the special subject of which it treats. The main statistical fact which it records is that on 1st January 1905 there were 17,241 insane persons under the cognisance of the Lunacy Board. This shows an increase of 347 over the number for the same date in the preceding year. This total increase is made up of a rise of 368 in the number of patients in asylums and private houses, and a fall of twenty-one in the number of the insane in the Lunatic Department of the General Prison (three) and in the Training Schools for Imbecile Children (eighteen). Pauper patients in establishments increased by 296, whereas in the preceding five years the average increase was only 261. It is interesting to note that to this increase the county of Lanark contributed 182, or considerably more than the half of the total. The next largest contributors are Edinburgh (sixty-two) and Aberdeen (fifty-seven). The combined increase for these three districts comes, indeed, to more than the total for the whole country. Of those showing a decrease, Forfarshire easily takes the lead with sixty-three. In this case the fall is accounted for by the energetic recourse to boarding-out which has been followed in this county, especially in Dundee. Twelve counties show either a fall or no change, while twenty-one show an increase.

A more reliable gauge of the amount of occurring insanity can be gathered from the number of direct admissions. 1904 showed a total increase of twenty-seven over that for 1903. This was made up of a decrease of ninety-one in the number of private patients, and an increase of 118 in pauper patients. A still more accurate gauge can be obtained from a comparison of the ratio of first admissions to the total population. This information is given in a most useful summary. The figures on this basis relating to private patients show no increase during the last three quinquenniads, remaining at 10 per 100,000 of population, while those for pauper patients have risen from 42 per 100,000 to 48. The main conclusion drawn by the Commissioners from these facts is that the figures relating to pauper patients indicate that the section of the community which furnishes them is more and more approaching the extensive use of asylums long ago established to its fullest extent in the section from which private patients are drawn. In this connection it would be of value to know whether any attempt has been made to estimate the number of private patients, especially in the Royal Asylums, who do not belong to Scotland. If this figure is at all large, the above conclusion is to that extent vitiated. The whole question is exceedingly complex, and dependent on many variable factors, *e.g.*, the relative degree to which accommodation is available for private and pauper patients respectively.

The proportion of patients discharged "recovered" to those admitted is somewhat below that for the preceding year, and the same may be said with respect to the deaths.

An interesting new table is given for the first time. It shows for each county in Scotland for each of the last five years the number of pauper patients placed for the first time on the register either by admission to institutions or by being left at home on certification, and showing also the proportion per 100,000 of population which these numbers bear to the total population of the county. If this table is continued, it will in time furnish very reliable data respecting any changes which may affect the occurrence of fresh insanity in the various counties, and in Scotland as a whole. During the five years under notice there has been no change, the average being 50 per 100,000 of population. Inverness comes highest with 71, and Kirkcudbright lowest with 29.

The table giving the changes which occurred among 2539 new cases admitted in the year 1898 is continued, and amongst other interesting facts it may be noted that, at the end of the year 1904, 659 of these were still in an asylum.

A number of pages in the report are devoted to the question of the cost of district asylums. This is a most important subject, but from its nature it is too complex for condensation. Those interested in it will obtain minute and authoritative information from the facts set forth there.

The interesting inquiry into the causes of the great difference between the statistics of insanity in the islands of North and South Uist, begun the year before, was continued in 1904. All the cases of certified insanity in these two parishes were investigated, and the histories are carefully tabulated. The conditions of life were found to be on the whole better in North than in South Uist, and yet the latter has the better position as regards insanity. Migration and loss of population apparently affect the two parishes equally. Comparison of the family histories brings out certain important facts. Close intermarriage is rare, and cannot be considered as a specially operative cause. Hereditary influence, however, appears in many cases. One striking fact is that certain individuals and families appear to be prepotent in the direction of mental instability, and that this factor accounts for a considerable number of cases. But this does not explain the difference between the two parishes. Neither do differences in mode of life, occupation, nor general surroundings. The only marked difference is one of religion, and into this highly debatable question the report very wisely declines to enter. The question of immunisation, in favour of which some investigations in Switzerland have recently been brought forward, is not touched upon, probably because it too is a highly debatable one. It is distinctly disappointing that this careful investigation has so far not led to any decided conclusions, as the circumstances of these parishes seemed specially favourable to their attainment.

The Etiology of Malta Fever.

THE Fourth Report of the Commission appointed by the Admiralty, the War Office, and the Civil Government of Malta for the investigation of Mediterranean fever is a record of most painstaking work, which will doubtless prove of great value to other workers on the subject. Unfortunately, the members of the Commission have been unable to arrive at any definite conclusions regarding the mode of propagation of Mediterranean fever, and, in the meantime, measures for prophylaxis which, owing to the great prevalence of the disease among our soldiers and sailors, are urgently required, must be conducted on general and unsatisfactory lines. Some of the more important features of the report may be briefly considered.

As regards ambulatory cases, Shaw proves the existence of this form of the disease, and shows that urine in such cases contains the *Micrococcus melitensis*, and is a source of infection, at least to goats and monkeys.

The viability of the *Micrococcus melitensis* is a question of great interest. Several members made observations on this point, which is of importance owing to the probability of infection being conveyed by dust contaminated by the urine of infected men or animals, such as goats, cows, dogs, and mules. It was found that the microbe survived for twenty-eight days in ordinary street dust, and for sixty days in sterile garden soil, and it was found possible to infect goats by means of dust polluted with the urine of Mediterranean fever patients. When Zammit, in June 1905, discovered that the blood of certain goats reacted to *Micrococcus melitensis*, and later showed that the milk of a large proportion of the goats furnishing the milk supply of Malta contained the organism, it was confidently hoped that at length one mode of dissemination of the disease had been discovered. The further facts now brought out in the report under consideration tend to support the theory.

Zammit finds that the milk of infected goats causes agglutination of the *Micrococcus melitensis*, and this method (Zammit's test) may be used either in the ordinary way on a slide, or in capillary pipettes. Zammit claims that it is more simple than the blood test, and quite as reliable; he examined 710 samples of milk, and obtained a positive reaction in 133 cases. Shaw found that among a fairly large number of goats in full milk 33 per cent. were infected, while of a similar number of cows examined 30 per cent. were found to be suffering from the disease. Horrocks and Kennedy state that 41 per cent. of the goats in Malta are infected, and that 10 per cent. of the goats supplying milk in various parts of the island appear to excrete the *Micrococcus melitensis* in their milk; they also show that monkeys and goats can be infected by feeding with the naturally infected milk. The observation that Pasteurisation (68° C. for ten minutes) destroys the micrococcus in milk suggests at least one method of prophylaxis. Davies states that there is a "considerable presumption that the disease may be introduced by infective goats' milk," and, as a matter of fact, he found that among those using unboiled milk the cases were 75·81 per thousand against 32·57 per thousand in those drinking only boiled milk or using condensed milk. As to the part played by mosquitoes, numerous experiments were made with a view to ascertaining whether the mosquito is an active agent in the propagation of the disease. Out of a total of 896 mosquitoes dissected, the *Micrococcus melitensis* was only present in four, and it is specially noteworthy that of 431 mosquitoes captured in wards containing Mediterranean fever cases only one was found to be infected.

The cases quoted as proof of successful experimental inoculation are inconclusive: the Lazaretto attendant supposed to have been infected by the bite of a mosquito had presumably been in close contact with infected men and animals for a long period, while monkey No. 93 had been used only a few weeks before for experimental infection by means of dust.

Gilmour discovered the micrococcus in the peripheral blood in 82 per cent. of his cases as early as the second day, and as late as the 300th day in certain instances. It is therefore possible that mosquitoes or other biting insects may be one means of propagation of the disease, but further work in this connection is necessary, and to avoid all sources of error it should be carried out under conditions in which other modes of infection can be absolutely excluded.

Davies investigated the disease from an epidemiological aspect, and while his report is a most voluminous one, the conclusions reached are somewhat indefinite. He considers that "transmission by direct or semi-direct contagion, or through the agency of mosquitoes, appears from the evidence to be more probable than in any other way; it is difficult to separate these two modes of dissemination the one from the other under the circumstances existing in Malta, and provisionally, I think, they may be considered together. Fully admitting that no proof has been afforded in support of this opinion, I still consider that there is a high degree of probability attaching to it, and one quite sufficient to warrant the adoption of certain measures of prevention or precaution."

Hereditary Transmission of Disease and Temperament.

OUR attention has been drawn to an inquiry recently undertaken in this country by Dr. John Macpherson, Commissioner in Lunacy, and in England by Professor Karl Pearson of University College, London. The object of the inquiry is to determine the extent to which special diseases are inherited, and how far various physical ailments are associated with special mental temperaments and degrees of ability. The only way to obtain knowledge on these subjects is by the issue of specially constructed schedules to individuals throughout the community. We understand that there has been, so far, a gratifying number of returns from laymen, but that the response from the medical profession, in Scotland at any rate, has been disappointing. That such should be the case is regrettable, for upon this subject there is absolutely no existing information whatsoever. All previous inquiries have been of a purely medical nature, and limited to selected classes of disease as these are met with either in hospitals or in private practice. The distribution of disease and its hereditary predisposition in the general community has never hitherto been investigated. In a collective investigation of this kind it is essential that all classes of the community should be represented, and we therefore cordially commend the object of the research to our readers, whose opportunities for observation of this kind are necessarily very extended.

THE resignation of Dr. M'Kendrick, Professor of Physiology in the University of Glasgow, has not come as a surprise, since many have been aware for some time past that he desired to relinquish the post, which he has held with such distinction for many years. The *fait accompli*, however, raises the question of who is to succeed him. We have heard of several candidates, and amongst them the names of such well-known physiologists as Professor Weymouth Reid of Dundee, Professor Stirling of Manchester, Professor Thompson of Dublin, and Dr. Noël Paton of Edinburgh.

All of these gentlemen have won a high place amongst contemporary physiologists, and have strong claims for the position. We must confess, however, that our sympathies go out to Dr. Noël Paton. There are few, if any, more successful teachers in the country at the present time, while his reputation as a scientific investigator and also as a leader and initiative force in the research work of others, has for many years exercised a great influence amongst the younger graduates of Edinburgh and of other Scottish Universities.

THE announcement of the publication of a new work upon the Science and Art of Surgery will be welcomed by all those interested in medicine, more especially as it is to be distinctively American in character. No foreign writers have been invited to take part, so that we shall thus have an opportunity of becoming acquainted at first hand with the methods and practice of our friends across the Atlantic in an art which they have done so much to advance.

The names of the editors, Dr. Joseph D. Bryant and Dr. Albert H. Buck, together with a survey of the list of writers whom they have invited to contribute, afford a guarantee that the work is destined to take a very high place amongst the treatises upon the practice of surgery.

So far as we can learn, this summer will see large numbers wending their way to what we may euphemistically call the Nijni Novgorod, or great annual fair of British Medicine, which is to be held this year in Toronto.

It is highly probable that a considerable number of those attending the meeting will desire to see for themselves something of the vast extent of our greatest colony, and to take the opportunity of crossing the Continent to the Pacific coast.

To those who have such an intention we would give the warning to make early application to the local secretaries at Toronto, who have arranged for special trains at greatly reduced cost. If possible, arrangements will be made for groups of friends travelling together, provided the names are sent in good time.

WE regret to record the deaths of Sir Halliday Macartney, K.C.M.G., who took the degree of Doctor of Medicine of Edinburgh University in the year 1858, and who was universally known for his long and distinguished services under the Chinese Government; also of Dr. Douglas Speirs of Lochgoilhead; Dr. James Duncan Jeffrey of Ayton; and Dr. James Grant of Grantown-on-Spey.

ORIGINAL COMMUNICATIONS.

THE TIMES OF HARVEY.[1]

By SIR HALLIDAY CROOM, M.D., *Professor of Midwifery in the University of Edinburgh.*

HARVEIANS,—This is, as near as may be, the 249th anniversary of the death of Harvey, and the 124th occasion on which the so-called Harveian Oration has been delivered in the Edinburgh College; and this year will complete the 250th occasion upon which the Harveian address has been delivered in London since the function was inaugurated by Dr. Edward Emily in 1656. It must therefore be very sufficiently apparent to you that ample opportunity during all these revolving years has been afforded to the succeeding orators to discuss Harvey's life, and to approach it from every possible aspect.

His life and work have been dealt with in these long series of addresses in more or less eloquent and impressive terms. Not only have his personal history, his methods of research, his reasoning, his discoveries, and all questions cognate to these been minutely investigated, but his character as a man, physician, and philosopher, and his position as a physiologist have all been probed to the core; each successive author vying with his predecessor in the endeavour to throw fresh light on this famous personality, and justify his claims to posthumous greatness. I therefore cannot hope to be able to add to the facts already known, or to place them before you in any new light.

I confess that his work on Generation appealed to me as the subject which, from my own standpoint, I should by preference have adopted as my thesis; because, after all, his work, "Exercitationes de Generatione," is only second in value to his *magnum opus* on the circulation, and would alone entitle Harvey to the honours that have been so profusely, and justly, showered upon his name. For in this treatise he grapples with two of the most difficult problems of biology,—the problem of generation and the problem of development; but it was obviously impossible for him to solve these problems, as they can be approached only through the microscope, and Harvey was dead long before the fathers of microscopy began their work. Through all his work on Generation he evinces an elevated piety, and loses no opportunity of giving utterance to his sense of the immediate agency of the Divine in nature. This position of Harvey's work, however, has been so recently and so ably dealt with by Dr. Alexander Ballantyne of Dalkeith, that I do not venture to traverse that subject again. I felt it therefore a relief to myself during the winter to leave the more scientific and medical aspects of Harvey's work aside, and rather to look at the time in which he lived. I therefore propose to make a short excursion with you into what I fear is well known history; but as all true Britons must love their land,

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[1] Being the address delivered at the Harveian Festival, May 1906.

> "With love far brought, from out the storied Past,"

I have selected his times rather than his work for our consideration this afternoon.

These times, extending as they did from 1578 to 1657, a period of no less than seventy-nine years, embrace a most eventful era in the history of our country and of Europe. It would be difficult, if not impossible, to select other seventy-nine years in the last eighteen centuries which were fraught with greater issues, and which have gone further to mould the character of our people, and build up the political and social constitution of this country; hence it has been and still is the haunt of the historian, the happy hunting-ground of the historical novelist, and a very garden of romance.

Consider for a moment that Harvey was born about the middle of the long reign of Queen Elizabeth, that he lived through the twenty-two years that James the First was King of England, and the twenty-four years of the reign of Charles First, and on through the Commonwealth to within a year of the death of Cromwell himself, and it will be seen at once that his life covered a period of extraordinary and perennial interest.

When Harvey was born in 1578, Elizabeth had been twenty years queen, and was now 45 years old. Yet we find her coquetting with the Duc d'Alencon, who was the nominee of France for the Netherlands, against Don John of Austria, who had just been appointed Regent by Philip of Spain.

James VI. was a boy of 12, and had been King since he was two years old, under the regency of his grandmother, Mary of Guise. His mother, Queen Mary, was a prisoner in England at Chatsworth, where she was allowed a considerable amount of freedom. She was about 36, and was continually intriguing against Queen Elizabeth. She was the hope of the Catholic party; and Don John of Austria, half-brother to the King of Spain, the hero of the battle of Lepanto, was determined to land an army in England for the purpose of marrying her and claiming the crown.

France was in the throes of the Huguenot wars. Henry III., the last of the Valois, was on the throne, and completely under the influence of his notorious mother, Catherine of Medici.

Philip of Spain was vainly trying to subdue the Netherlands, and, far from accomplishing it, we find them more independent than ever, and the year after Harvey's birth, the seven northern provinces united and made William of Nassau their first Stadtholder.

I. If we turn to his *boyhood*, Harvey was about 9 years old when Elizabeth was driven to what was considered by her councillors the necessity of terminating the life of Mary of Scotland. But that romantic, eventful, and unfortunate career, though seemingly closed, is even now, more than 300 years after, a perennial source of controversy as to the merits and demerits of these two queens, related as they were, yet so different in character. As a writer of Queen Elizabeth's life has said, "Mary could love and she could hate. Elizabeth had only likes and dislikes, and therefore played the cooler game. When Mary really loved, which was only once, all selfish calculations were flung to the winds; she was ready to sacrifice everything, and not count the cost,—body and soul, crown and life, interest and honour. When she hated, which was often, rancour was apt to get the better of prudence, and so, at the fatal turning-point of her career, she went down before her great rival, never to rise again. Here was a woman indeed! and if for this reason she lost the battle of life, for that reason too she still disputes it from the tomb. She has always had, and always will have, the ardent sympathy of a host of champions, to whom the 'fair vestal throned in the west' is a mere politician,—sexless, cold-blooded, and repulsive."

This blow at papal aspirations in England, for it was considered as such, was followed by a counter-stroke in the following year from Spain, by the sailing of the Great Armada. We can easily imagine how Harvey as a boy of 10 years old, living, as he then would be, at Folkestone, on the southern seaboard, would be interested and excited, as all England was, by this great event. His native town, placed in the narrows of the Straits of Dover, would be the very centre of excitement, and must have been crowded with soldiers ready to resist a landing. The danger must have been a very real one, as the Armada came majestically on in a vast crescent of 132 ships, with the small but active ships of the English fleet under the command of Howard, Drake, Seymour, Frobisher, Hawkins, and others hanging on their rear or shooting past them, like terrier dogs worrying a bull. The stately Armada ultimately cast anchor off Calais, to await the Duke of Parma's ships from the Netherlands, which never came. From this anchorage Drake's fire-ships forced them to slip their cables and flee, and, after engaging the English fleet in a disastrous running fight off Gravelines, they fled by the only channel left open—round the North of Scotland, whither they were followed by the English fleet as far as the Firth of Forth, after which the storm that befell them and the rock-bound coast completed the work of destruction.

From this time on to the death of Elizabeth was the great period in English history when the air was full of the hum and excitement of adventure and enterprise; when St. George's cross was carried over all seas, from the Southern Atlantic to the White

Sea; when her naval supremacy took the place of that so long held by Spain; when new continents and countries were discovered; when at all the southern ports vessels were arriving, laden with the plunder of the Spanish Main; when men's minds were excited with tales of the strange countries, peoples, produce, and riches to be found across the ocean; and when the great wave of the Reformation, joined with the Renaissance in literature, philosophy, and poetry, made this time the great era of expansion and advance.

All these influences, however, seem in no way to have affected young Harvey. The siren allurements of adventure and riches on the Spanish Main with him fell on dull ears. Possibly, even at this age, he felt there was a field of adventure and discovery nearer home, and within himself, that claimed all his energies,—the "human form divine," with its mysterious complex life pulsing through its frame, kept beckoning him on to a discovery for which the world was waiting, and in comparison to which the dreams of mere material wealth were as nothing. This, no doubt, led to his adoption of medicine as his profession.

In his choice of Padua as his university he was probably influenced by several considerations. It was the home of a renowned school of anatomy, rendered famous first by Vesalius, the pioneer of modern anatomists, and, in Harvey's own day, by Fabricius of Aquapendente. Further, Padua was the university town of Venice, and, under the sway of the great maritime capital, enjoyed a religious liberty which made it a much safer place of residence for a Protestant than any of the other continental university towns. So much was this the case, indeed, that English and Scotch students of medicine and law flocked to Padua in considerable numbers, and English and Scotch "nations" existed in the university for more than a century. Lastly, there was the more sentimental reason, that Caius, the famous Grecian and founder of his old college at Cambridge, had been a Professor of Greek at Padua—a link which would probably make young Harvey more welcome at the Italian university.

II. If we pass to the *early manhood* of Harvey, we find that he was about 25 when Queen Elizabeth died and James ascended the English throne in 1603, and thus, by uniting the crowns of England and Scotland in his person, took the first step to the union of the countries. At this time Harvey had his degrees as doctor from Padua and Cambridge, and was settled in London, which, at the time of James's accession to the throne, was devastated by an outbreak of the plague, that cost London one-sixth of its population, and greatly reduced the grandeur of the coronation. Harvey would be a doctor of only eight or ten months' standing, and must have had ample scope for his talents in dealing with the plague, if he had the courage to do so. We are told that the principal preventives in use were rue, wormwood, and rosemary, the price of which rose to a high figure, and that the fashionable gold-headed cane of the doctor had its origin at this period, the gold head forming a scent-box which it was customary for the doctor frequently to put to his nose as a preventive to infection. The theatres in London, which were producing Shakespeare's plays at this time, had to be closed to prevent contagion, and were not allowed to open until the death-rate fell to thirty per week, which was not until 1607. By this time Harvey was married, and elected a Fellow of the College of Physicians.

James had scarcely reached London in his royal progress from Edinburgh, when one of the rocks against which he and his family were to dash themselves presented itself, in the form of what is known as the Millenary Petition, from its being signed by one thousand of the Puritan clergy of the Church of England, its object being to modify certain of the practices of the Church which they considered abuses. To consider this petition, he called together in the following year the Hampton Court Conference, before which both sides stated their case, but in such disproportionate numbers that the result was a foregone conclusion, and the door of toleration was shut in the face of the Puritans, many of whom were harried out of the country. One good result of this Conference, however, was the revised edition of the Bible in the form we still use, which, more than any other book, has moulded the character and language of the people of Britain.

On the other hand, from this Conference may be said to have dated the two parties into which society was divided, and which more or less have continued ever since, namely, the High Church party, which always sided with the monarchy and divine right, and the Puritan party, which was with the rights of the people and Parliament. Harvey, no doubt, being a strong Churchman and courtier, would side with the former, but could scarcely fail to see then, what he lived to experience, that the rising tide was against him.

James had no sooner settled this ecclesiastical question to his own satisfaction, than he found himself among the breakers surrounding the second rock, that of his Parliament, with which he remained in constant conflict during his reign,—a conflict which he bequeathed to his son, with such disastrous results.

As the Parliament was always strongly Puritan, this decision of James against the Puritan party in the Church of England (for they were in no sense Dissenters) was resented, and they insisted on similar strong measures being taken against the Catholics. This accordingly James did, and severe penalties were put upon all Catholics. This oppression of the Catholics brought about the Gunpowder Plot, with which the leading Catholics were mixed up. The discovery and execution of Guy

Fawkes and the conspirators, and the outburst of loyalty to the King and Parliament, and of detestation of the Catholics, which followed throughout the country, threw James more decidedly into the Protestant cause in Europe, and made his own position at home more secure. Unfortunately, this security also brought out the real character of James, which was that of a spendthrift, always in need of money, and an arrogant upholder of the royal prerogative and divine right. This latter, although a virtue in Scotland, where the kings had ever to hold their own against a turbulent nobility, approached nearly to a vice in England, where Parliament had been so long the advisers of the monarchy (at least, as far as finance and taxation were concerned). Though a man of learning and shrewd common sense, he compared badly with his great predecessor, Queen Elizabeth, who, while often in conflict with her Parliament, had always the grace to yield rather than push a difference to an extreme, and prided herself in governing according to the wishes of the people.

During all these years Harvey spent most of his time in London. He was appointed Physician to St. Bartholomew's Hospital in 1609, and Lumleian Lecturer in 1615, during which time he is supposed to have propounded and developed his great discovery. We can imagine him one of the crowd that collected day after day to see Sir Walter Raleigh take his daily exercise inside the Tower Yard, until the crowd got to be a popular tumult, who demanded his release, saying he was "too fine a bird to keep in a cage." Or he may have been one of that greater crowd that assembled at his execution in 1618, when that popular hero, after all his honours, adventures, brilliant attainments, and services, when old, broken in health, and disappointed, had to end his days by laying his head on the block.

Harvey would be in London when James's daughter, the Princess Elizabeth, made the popular marriage to the Protestant Prince, the Elector Palatine, and thus gave us our present Royal Family through the House of Hanover. This marriage was largely due to the wisdom of Cecil, the benefit of which the nation now enjoys. Harvey in all likelihood was present when Baby Charles and Steenie returned from Spain, with the Spanish match broken off, and Charles still a bachelor. None were more surprised than themselves at their extraordinarily enthusiastic reception, when bonfires were blazing all over London, church bells ringing, and the Prince and Buckingham could scarcely make their way to the palace for popular congratulations. This should have taught James a lesson, if anything could, that England was nothing if not Protestant; Spaniard and Catholic were alike abhorrent to the nation at that time.

III. Glancing now at Harvey's *middle life*, he was about 45 when King James died, and the last purely Scottish King leaves the stage. He may have been, as Henry the Fourth of France said, "the wisest fool in Christendom," but James, with all his faults and failings,—and they were many,—was to a great extent the outcome of his surroundings. This was especially true of his love of power and the divine right. His personal character, which is so well portrayed by Sir Walter Scott in "The Fortunes of Nigel," if lacking in dignity, had a charm of its own. The homely broad Scotch, the shrewd pawky wisdom, his ready use of the classics, his familiarity with his intimates,—Baby Charles, Steenie, Jingling Geordie,—his dry humour and infinite pleasantries, his ambition, and love of peace, were all characteristic of the race he sprang from.

Charles the First ascended the throne in 1625. Strange to say, the commencement of his reign, like that of his father, was also marked by an outbreak of the plague. Whether this be regarded as an omen, or merely an increase of the plague which in large cities was never wholly absent, and might easily have been increased by contagion, owing to the stir and bustle of the coronation, it is difficult to say. It, however, along with other things, delayed the coronation a year, and was even more fatal in death-rate than the outbreak of 1603. Harvey, who was already connected with the Court as physician extraordinary, was advanced to physician in ordinary to King Charles, and appears to have been favoured with the intimacy and friendship of the King to the last.

Charles's reign and policy were practically a continuation of his father's. Buckingham was his Prime Minister; and in spite of all his failures,—many of the most disastrous nature,—he did not lose the friendship and confidence of Charles, who never deserted his favourite even when the country and Parliament were crying loudly for his dismissal. Charles was a much improved edition of his father in appearance and manners; his Court and privatel ife were without reproach; he was refined in his tastes, a keen patron of art and science, a religious, serious-minded man, and not lacking in accomplishments,—he is said to have been one of the finest horsemen in Europe. Yet with all these virtues and accomplishments he was a man of so obstinate a nature that he would stoop to almost incredible duplicity to attain his own way. Such was the man who ascended the throne just at the moment when judicious concessions were most needed to meet the popular demand of the age for a larger share in the Government, and when the principle of divine right had become offensive to the conscience of a religious-minded people, who could acknowledge an earthly king only so far as his demands were in accordance with their conscientious belief in the Divine will. But Charles was the last man willingly to grant concessions or modify his royal prerogative. As Sir Ferdinand Fairfax said, "The King is in his own nature very stiff." A conjunction like this could only end one way.

Charles had scarcely been more than a year on the throne before he and Buckingham had quarrelled with Parliament, Church, and people. The disastrous ending of the Mansfield expedition, his unpopular marriage with Henrietta Maria of France, the loan of English ships to the French to blockade the Huguenots in Rochelle, and the consequent desertion of the English sailors, all incensed the people against Buckingham; so that, when Charles summoned his first Parliament, they only voted about one-fifth of the money asked.

Then the expedition against Cadiz ended most disgracefully. Charles next quarrelled with his wife's Catholic household, and drove them out of the kingdom, and consequently drifted into a war with France, which to gain popular favour took the form of an attack on the Island of Rhé, opposite Rochelle, in support of the Huguenots. But this also, like most of the Duke of Buckingham's efforts, ended in failure, retreat, and loss.

When Charles's third Parliament met in 1628, they agreed to five subsidies, but declined to pass them until their famous Petition of Right was granted, embodying the Habeas Corpus Act. The King, after much haggling, at length was induced to grant this, albeit with a bad grace. The House was prorogued in June, and in August Buckingham, while preparing for another expedition against Rochelle, was stabbed to the heart at Portsmouth by Felton, a man who had served as a lieutenant in the first expedition. The country was overjoyed at Buckingham's death, but to Charles it was a heavy loss.

Sir Thomas Wentworth (afterwards Earl Strafford) was won over to the King's side on the removal of Buckingham, and henceforward became a mainstay of the Court, while Bishop Laud, now Bishop of London, took the leading part in enforcing conformity to the Anglican Church. When Parliament reassembled, they met sore at the desertion of many of their leaders, and at the way in which the Petition of Right and their religious views had been thwarted; and the King, seeing that the House was inimical to him, dissolved Parliament, and for ten years continued to govern without one. By the harassing and burdensome devices, all on the verge of illegality, that he used to raise money during this time, such as the selling of titles, the imposing of fines, the granting of monopolies, and finally the tax of ship money, which was resisted by John Hampden; and in religious matters, by the heavy fines and brutal punishments imposed by the Star Chamber, —Charles worked the country into discontent and hatred of his government.

During these early years of the reign of Charles I., Harvey was mostly in London, and more or less about the Court. It was during this period that he brought out the book in which his great discovery is expounded, "Exercitatio Anatomica de Motu Cordis et Sanguinis." It is dedicated to King Charles, and the

King in his kingdom is likened to the heart in the body. In 1630, Harvey got leave from the Governors of St. Bartholomew's Hospital to travel on the Continent with the Duke of Lennox, in accordance with the King's command, and this suggests a suitable occasion to briefly glance at the events which had been taking place on the Continent during the life of Harvey.

In looking over this period, three great outstanding names present themselves: William of Nassau, Prince of Orange; Henry Fourth of France, Henry of Navarre; and Gustavus Adolphus, King of Sweden, the Lion of the North. These all pass upon the stage of European history during the long life of Harvey.

In 1584, when Harvey was but 6 years old, that great patriot, William the Silent, Prince of Orange, was basely shot dead by the bribed assassin Gerard. His character, so finely portrayed by Motley in his "Dutch Republic," must ever remain one of the very highest examples of the triumph of patriotic heroism, religious conviction, and devotion to the cause of the Reformation over the greatest powers then existent in Europe,—the combined might of Spain and Rome. This triumph he and the Dutch were left to win single handed. Elizabeth and some of the German Protestant princes, though favourable to his cause, gave him little or no assistance. He was no narrow-minded bigot, who merely exchanged the creed of Rome for that of Calvin, but one who, while sincere and firm to his own conviction, extended liberty of worship to all. This long heroic resistance and patient endurance of the Dutch, led and stimulated by William, so wore out the resources of Spain, that in spite of the relentless rigour of Alva, Requescens, and Parma, she had to abandon her prey, and thus admit the independence of Holland, which rose to be the greatest sea power in Europe, and continued for over a hundred years to be the greatest over-sea carrier in the world.

Harvey would be about 12 years old when Henry of Navarre achieved his crowning victory at the battle of Ivry in 1590, and three years later reigned over France. He, however, gained his end not merely by a compromise, but by abandoning the faith he had fought for, although by the Edict of Nantes he made Protestants eligible for all public posts, and granted freedom of worship to them in certain parts of his kingdom. Henry, during the remaining twelve years of his life, showed himself the greatest and wisest king France ever had, and one who worked for the greatest good of the greatest number. "The poorest peasant in my realm," he said, "shall eat meat every day, and have a fowl for the pot on Sunday."

France was ruled by this great King when Harvey as a young man of 18 passed through it on his way to his studies at Padua, and on his return with his degree of Doctor. Henry IV., and his great minister Sully, and the other characters and incidents of this period, have been made to live again by Mr. Stanley Weyman in his popular novels.

By the time Harvey again visited France, in the summer of 1630, in the company of the Duke of Lennox, the dagger of Ravaillac had done its work,—the best loved King of France had passed away, and his son, Louis XIII., reigned in his stead; or it is more correct to say that France was now under the Red Robe, as Cardinal Richelieu was king in all but the name.

Harvey, in this visit to France with the Duke of Lennox, seems to have spent most of his time in Paris, as he was back in London in October. But in the following year he was in France again, when he visited Blois, Samur, Bordeaux, and in February 1632 he was in Spain, and probably visited Venice. These visits to the Continent took place about the middle of the Thirty Years' War, which desolated Europe to an extent now hardly conceivable, —large tracts of country, which were at the commencement under cultivation, lapsing back into forests and desert, and the population dwindling to about one-third of its former number. Harvey writes to the Duke of Dorchester, describing the deplorable condition of the countries, "how they were so wretched that by the way he could scarcely see a dog, crow, kite, or raven, or any kind of thing to anatomise, only a few miserable people, the reliques of the war and the plague, which famine had made anatomies of before I came."

This great war, beginning as it did in Bohemia in the attempt of King James I.'s son-in-law, the Elector Palatine, to become King of Bohemia, went on from 1618 to 1648, until almost every nation in Europe was dragged into it. Richelieu, who had subdued the French nobility and the Huguenots, turned his attention to interfere in the Thirty Years' War. His great aim was to subdue the power of the House of Austria and Spain, and thus, though a Roman cardinal, we find him on the side of the Protestant cause. Through his intrigues, the great Wallenstein was deprived of his command, and he never rested until he had the Protestant armies under the greatest soldier of the age, Gustavus Adolphus. An enormous number of recruits flocked to take service under this great commander, as he was the highest exponent of military art of his day, and the cause moreover was popular. Next to Sweden, it was from Scotland that Gustavus drew the greatest number of his men and officers. It is said that at one time he had no less than thirteen regiments of Scots, whole districts in Scotland being denuded of their young men by this war. Of his Scottish officers, Hepburn, Munro, Leslie, Ramsay, Hamilton, all rose to positions of high trust.

The brilliant and victorious career of Gustavus was cut short at the battle of Lutzen, where, though the battle was won, a crowning victory for the Protestant cause, the hero Gustavus was killed.

Coming back to England, Charles, having dissolved his third Parliament, for ten years governed without one, and, as we have shown, reduced England to a state of discontent. The condition of Scotland and Ireland was little better. In the year after the death of Gustavus, in 1633, Charles went to Scotland to be crowned, and Harvey, who was one of his suite, we find visiting the Bass Rock, studying the bird life there, a book being still extant by him giving an account of gannets, etc. Charles during his stay in Edinburgh found leisure to play golf on Leith Links, but was mostly engaged in deliberately tampering with the powers and privileges of the Scotch Parliament, and likewise with the Church, by introducing the Service Book and the ritualistic measures of Laud, who assumed supremacy over the Scotch Church, in virtue of being Archbishop of Canterbury. This could not be tolerated, and riots occurred in Edinburgh,—as in the case where the famous Jenny Geddes' stool figured,—and in many other towns. But Charles had not the sense to withdraw these offensive measures, and thought to punish Edinburgh by changing the seat of Government to Linlithgow. Matters reached such a pitch that every proclamation by the King was followed by a protest from a Board consisting of nobles, barons, burgesses, and clergy. At length the Covenant was signed in Greyfriars' Churchyard, and sent through Scotland for signature, and people crowded to the churches to accept it.

Affairs became so bad in Scotland that war was inevitable, and the country rapidly prepared for it. Under Field-Marshal Alexander Leslie, the Scotch army moved to the Border. The King found it so formidable that he thought it safer to treat with the Scotch, and the Treaty of Berwick was signed, merely, however, to gain time. What was known as the Short Parliament was called, but they stated all their grievances and would not vote supplies for the Scotch war, so they were dissolved. The Scots continued to advance into Northumberland and Durham, but Charles had no money to pay his army, which was mutinous and discontented, so he called a Council of Peers at York, which advised him to summon Parliament, and the Treaty of Ripon was made with the Scots.

The Long Parliament, as it was called, met in a temper to remove the abuses in Church and State. Strafford, Laud, and others were impeached, and Strafford was executed. Ship money was declared illegal, the Star Chamber abolished, and a triennial Bill passed for Parliament. Charles had to yield on all these points, but he had lost the confidence of the Parliament and people, and the measures he now so readily passed, they feared he did so merely for the purpose of annulling when one day he should again have the power.

He again visited Scotland in 1641, and distributed favours and titles and granted concessions, but his apparent reconciliation with the Scots was marred by the discovery of a plot to kidnap and murder their leaders, Argyle and Hamilton, in which there was reason to believe the King was mixed up. Similarly, when he returned to England, the good effect of the concessions given through Parliament was more than defeated by the removal of the military guard of the Commons and his attempt to arrest five members of Parliament. These actions on the part of the King showed that the concessions which he yielded were merely baits to lull suspicion and get his victims in his grasp. After this, the King in chagrin left London, never to return until his trial and execution. Reconciliation between King and Parliament became next to impossible, civil war was inevitable, and both sides prepared for it.

During the period from Harvey's visit to Scotland with the King to the outbreak of the Civil War, we hear of him in October 1633 requesting a meeting of the Governors of St. Bartholomew's Hospital, that he might lay before them some particulars concerning the good of the poor in this house. Dr. Andrew was also appointed full physician to the Hospital so as to give Harvey more liberty.

In 1634, four Lancashire women having been accused of witchcraft, Harvey was requested by the Earl of Manchester to arrange with the King's two surgeons, Baker and Clowes, to superintend their physical examination by ten midwives and seven surgeons, and as nothing unnatural was found on their bodies they were pardoned. In July of this year he is recorded to have presented a tanned human skin to the College of Physicians. In November he made a post-mortem examination of the body of a Shropshire labourer stated to have been 152 years 9 months old, and his report was published in 1669 by Dr. Bett.

In April 1636 he left London in attendance on Thomas, Earl of Arundel, who was sent on an embassy to the Emperor. In May he was in Nuremberg, and while there visited his great opponent, Professor Hoffman, but did not convince him. In October he was in Rome at the English College. When Harvey made this visit to Germany, the Thirty Years' War was still going on, but all the great leaders had passed. Gustavus was dead, Wallenstein assassinated, and the Emperor Ferdinand died the year after the visit of the Embassy which Harvey accompanied. The leaders now were Bernard of Weimar and Marshal Turenne on the Protestant side, the Imperialist generals being Piccolomini and John of Werth. The war continued with varying success till 1648, when the Treaty of Westphalia was signed and the respective states partitioned; but Germany was left in an utterly wretched condition, mere heaps of ashes marking the sites of towns, and forest and desert taking the place of cultivated fields. Nearly two centuries passed before the population was as numerous as before the war.

IV. Coming now to the events of Harvey's *riper years*, he remained in London till the outbreak of the Civil War in 1642, when he would be about 64 years old.

In April 1640 the first incident of armed opposition to the King occurred at Hull, where Sir John Hotham refused to give up the arms and ammunition of the late army stored there. At first this Civil War, which lasted for six years, was in favour of the King, the battles of Edgehill, Atherton Moor, and Newbury being all gained by him. But Cromwell, in the eastern counties, had gradually collected a body of cavalry,—his famous "Ironsides,"—and after 1644 the war went in favour of the Parliament. At Marston Moor the Parliamentary generals with the Scots who had been called to their aid, defeated the Royal army under Rupert, and the King's cause in the north perished at a single blow.

This was practically the turning-point of the war. The actions were henceforth almost always in favour of the Parliament,—Naseby, the siege of Taunton, Bristol, on to the fall of Oxford, and the battle of Philiphaugh in Scotland,—until the King was practically left without an army. He tried various intrigues with the different parties, but he fell into the hands of the Parliamentary army, and was imprisoned in Carisbrook Castle, and then in Hurst Castle.

The King was brought from Hurst Castle to Whitehall, and put on his trial. He refused to acknowledge the authority of the Court, but the president replied that no Court would allow its authority to be questioned. Charles attempted to demand a conference of Lords and Commons, but as he still declined to plead, sentence of death was passed on him. He bore himself with great dignity, and passed his last days in a calm religious temper. He was beheaded on the 29th December 1649.

To me, personally, it is a matter of interest that about this time must have been the dawn of comparatively modern gynæcology, for it is recorded of Harvey that, during the period of the Civil War, while the King's army was assembling at Nottingham, he visited his friend Percival Willoughby at Derby, and discussed various forms of uterine disease with him. It is true that gynæcology is but a recent branch of medicine, and although nowhere in the records of Harvey's life do we find any evidence of his having any accepted views on these matters, yet it is interesting —at all events to me—to know that Harvey, amid all his varied human interests and his scientific researches, yet found time to discuss with his friend a department of medicine that was only evolved two hundred years afterwards.

Harvey was present at the battle of Edgehill, and had charge of the two young princes, Charles and James, to whom he read a book behind a hedge, until, a cannon ball coming near them, they had to remove. He wrote a report on the health of Prince

Maurice, who was suffering from typhus fever, which was epidemic at the time in the King's army. He retired with the King to Oxford after Edgehill, and remained there four years. He cared little for politics, but worked at anatomy and dissection while there. He was made an M.D. of Oxford, 7th December 1642. Also in 1645 he was made Warden of Merton College by Royal Warrant in place of Sir Nathaniel Brent. In 1643 he received his pay for the last time as physician to St. Bartholomew's Hospital; and in 1646, after the surrender of Oxford to the Parliament, he retired to London, and resided in the houses of his brothers, who were wealthy merchants. We can imagine him one of that vast crowd that assembled at Whitehall, from a window of which King Charles stepped to the scaffold, and we can imagine his feelings when he saw his King, patron, and friend, after his short speech, and amid that deathly silence, lay his head on the block. This tragedy, we are told, sent a thrill of horror through Europe, and even the Czar chased the English envoy from his Court, saying he would not have the representative of a nation of regicides at his Court.

V. We now come to the last phase of Harvey's life, his old age. He was 71 when King Charles was executed and the Commonwealth began. It now fell to the army of this Commonwealth to maintain what they had been the means of bringing about; thus the heads of the army, Fairfax, Cromwell, Ireton, Lambert, had to appoint an executive government for the country. Kingship and the House of Lords were abolished, and the House of Commons declared the Supreme Court of the nation.

The army meantime placed the executive in a Council of State of forty-one members, most of whom had been in the House of Commons and some in the Lords. This number was raised to one hundred and fifty, and was really the Rump of the Long Parliament, which had never been dissolved.

The news of the execution of the King was received with horror in Scotland and Ireland, and caused a strong reaction in favour of his son Charles. Argyle and the leaders in Scotland proclaimed Charles II. immediately on receipt of the news of his father's execution, and invited him over from the Hague to ascend the throne. Charles arrived in Scotland, and later, after some demur, took the Covenant, and was crowned at Scone. This naturally alarmed the English. Cromwell, who, as Lord-Lieutenant of Ireland in 1650, had crushed the hopes of Charles there with a merciless hand, was recalled to take the command against the Scots. In September he defeated them at Dunbar, and then advanced on Edinburgh, and easily seized the town excepting the castle. Here he waited through the winter, while the Scots broke up into factions. In spring, marching into Fife, he left the way open into England, either intentionally or by mistake. Charles seized the opportunity, and marched south into England, but at

Worcester he was caught up and totally defeated. Charles managed to escape, and after many adventures succeeded in reaching France.

Cromwell and his army had thus put down all opposition in the three kingdoms, and when he marched triumphantly from Worcester to London, he naturally and of necessity had to take the chief authority in the State.

Meanwhile a war with the Dutch for the supremacy of the sea ended in the complete defeat of the Dutch off the North Foreland, and raised the prestige of the country so that the other great powers of Europe sought Cromwell's alliance.

Like Charles, Cromwell had great difficulty with his Parliaments. He was determined to have a constitutional Parliament chosen by the people, so he turned out the Long Parliament, which was still sitting. But none of the three Parliaments he summoned was a success, and ultimately he had to govern without one, having only a Council of State. His last Parliament suggested that he should be King, but he objected to the title of King, and was content with that of Protector. He maintained good order at home, disturbed principally by Royalist plots against himself. Abroad, he maintained a definite and vigorous policy, the result of which was to place England at the head of the Protestant powers in Europe.

Cromwell had many difficulties to face, and his health did not long stand the strain. He died on 3rd September 1658,—the anniversary of his victories at Dunbar and Worcester.

This brings us down to about a year beyond the death of Harvey. From the commencement of the Commonwealth, Harvey appears to have remained in London, where he was visited by Dr. George Ent, who brought away with him Harvey's manuscript of his treatise entitled "Exercitationes de generatione animalium, quibus accedunt quædum de partu, de membranis ac humoribus uteri et de conceptione." This was published in 1651, and in it he described the parts of the hen's egg, and the growth of the chicken, but he required the microscope to make clear what he only saw in part. This was his last published work. In the same year he offered, anonymously, through the president, to build a library to the College of Physicians, and on his name becoming known a statue was voted to him. The library was completed in 1654 and handed over to the College, when Harvey was elected president, but declined it owing to age. He served on the council until 1656, when he resigned the lectureship, and to the College he bequeathed his estate in Sussex. He died 3rd June 1657, a victim to gout,—a prosaic ending to a marvellous career.

Amid the wreck of reputations which time so commonly makes, the name and fame of Harvey, after the long lapse of nearly three hundred years, still meet us with undimmed lustre. His figure, indeed, is one of the imperishable beacons on the path of human progress. Though his long life extended over one of the most stirring and eventful periods of the world's *political* history, yet the records of poetry, philosophy, science, and art bear during that period many of the greatest names on the world's roll of fame,—Shakespeare in drama, Spencer in poetry, Bacon in philosophy, Cervantes in fiction, Galileo, Napier, and Kepler in science, Rubens, Vandyke, and Paul Veronese in art,—names that must for ever stand out in alto-relievo on the Temple of Fame.

> "Every thought of all their thinking swayed the world for good or ill,
> Every pulse of all their life-blood beats across the ages still."

ON THE PROGNOSIS OF CHRONIC NEPHRITIS IN THE YOUNG.

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Chronic nephritis in young people is generally viewed with great alarm. The patient's friends are told that it is a case of Bright's disease, and they consider that as a sentence of death at no very distant date. I do not look upon the matter in this light, but think that in many a case a more hopeful view is justifiable.

Case.—A young lady, æt. 24, was sent to me with the history that albumin had been discovered in the urine rather more than three years ago, after an attack of influenza. She was then kept in bed and dieted very strictly, until, as it was understood, the albumin had disappeared. During the last ten months she had been feeling languid and depressed, and had had a good deal of headache. She had changed her home, so that her doctor had not seen her before the present illness, and knew nothing of her save by report. He had found albuminuria, with occasional tube casts, stray cells, and oxalate crystals, and weekly examinations had been made ever since with the same result. She was a well-grown, active girl, fond of games and sport, and much resented being kept, as she phrased it, in cotton-wool. She had the typical renal countenance to a slight degree,—a little pallor and a slight, waxy thickening about the eyelids,—and her legs were slightly, very slightly, œdematous. She was then passing 70 oz. of urine daily. The samples sent me had a specific gravity of 1018, and contained 11 grms. of N (almost exactly 22 grms. of urea) and a full proportion of Cl (0·3738 per cent.) and of P (0·1492 per cent.). She was at this time on a diet containing no fish or meat. I allowed her to take fish, and on this richer diet she passed over 30 grms. of urea. Her other viscera seemed to be natural. The heart's apex was in the nipple line, the sounds were natural, the blood pressure not appreciably raised, and the artery wall not thickened. The lungs and the fundus of the eyes were quite healthy.

There could be no doubt about the diagnosis. It was a case of chronic nephritis. But beyond that it serves to exclude the transient condition called functional albuminuria, the use of that term conveys little knowledge of the origin, present state, or expectation of the disease.

To what is due the structural disease undoubtedly existing in the patient? Albuminuria had first been discovered in an attack of influenza. But influenza, though one of the most dangerous of all diseases, seldom strikes the kidneys,—so seldom that I made further inquiries. The girl had never had scarlatina: but there was a report of puffiness of the eyes in childhood, which made it probable that nephritis was of old standing. Of the diseases which bring on nephritis, scarlatina is the commonest, but it is much commoner to find no history either of scarlatina or of an acute onset; and in many cases that I have seen of nephritis in little children I have been quite unable, even then at the first of it, to discover to what it was due.

Nor can we form a very exact picture of the present state of the kidney. One thing we know—nephritis in the young is always diffuse or mixed nephritis. All the three constituents—the convoluted tubes, the glomeruli, and the interstitial tissue—are affected.

But even at the time we see the tissues, when the case has ended, the area, the proportion, and the degree of the disease vary greatly. In some instances the whole kidney is disorganised; in others we may find out of every four or five glomeruli only one affected, or the tubes only in certain places. In some the inflammation is chiefly in the tubes; in others, chiefly in the glomeruli. In some the tubes or glomeruli are in the catarrhal stage; in others the tubes have become dilated and the glomerular exudation laminated and hyaline. And if the variation is so great at the time of death, it is reasonable to suppose that it is much more variable, and much slighter, at the stage when, as in this patient, no severe symptoms have declared themselves.

We are, moreover, able to refer the changes in the urine with some probability to these various lesions. Thus it is almost certainly from the damage of the glomeruli that the albumin and globulin pass out of the blood. The more a case approaches the pure interstitial type the less are the glomeruli diseased, and the less is the albuminuria. The scanty urine of the early stage corresponds to a state of congestion, which so squeezes the kidney within its capsule that the blood passes, and the urine escapes, with difficulty. The early stage of a cold in the head is a familiar example of similar absence of secretion. As the congestion diminishes the urine increases, and often, with the removal of anasarca, rises above the normal. Such urine is of normal specific gravity, as was that of my patient. This may return to the normal quantity, and otherwise remain unchanged. So it was with her. When I saw her four months later, the total was 52 oz. per diem, the specific gravity of a twenty-four hours' specimen was 1018, and the albumin was a mere opalescence, while the urea was 25 grms., and the chlorine 0·216 per cent. Later on in such cases the quantity often rises again, but the urine is then of low density. This, again, we can explain. The fluid that escapes from the glomeruli in healthy kidneys seems, on the best evidence we have, to be chiefly water. It becomes more concentrated on its way through the tubes, partly through reabsorption of water, and partly through excretion of salts by the epithelium. By quickening the flow the fluid can be made to undergo less of the tubular change, and reaches the ureter more in the condition in which it leaves the glomeruli. Dilute urine therefore resembles glomerular urine.

When urine is dilute from disease, it almost always coincides with two morbid conditions,—a rise of blood pressure and fibrosis of the kidney. We may therefore fairly conclude such urine to imply that the kidney is being hurried in its work. On the one hand, the rise of pressure tends to make the blood flow more rapidly through the gland; on the other, the fibrosis means some loss of the tubular structure which should add to the solid contents of the urine. In later life, this, as every one knows, may go on for many years. In youth it is of more serious significance. It had not begun in my patient.

In any given case of nephritis the patient's chance must be the worse the greater the area of kidney involved, and the greater the degree of disease. But I think the post-mortem room has rather made me realise how great a change is compatible with life than the danger of slight disease. Many a time have I seen a big muscular person whose kidneys weighed less than 5 oz. To be sure the man died from his kidneys; but how long must he not have lived on them? Every nephrectomy, too, shows us that men can do with half their usual provision of kidney. It is an example of the universal redundance of nature. We could evidently afford to give away much renal tissue to disease,—if that was all.

In the days when dropsy and uræmia were both ascribed to insufficient excretion, that really was all. But it is not so now. There is no known urinary constituent which, when injected into the blood of animals, will cause uræmia; and though sodium chloride has some connection, yet this is by no means close, with anasarca. Analysis, again, has shown us that in man periods of uræmia are not marked by retention of the nitrogenous constituents, but rather by a greater excretion.[1] Renal toxins have taken their place.

Yet though toxins are now the favourites, the amount of the healthy renal tissue that remains is not the less important. It is to be supposed that the kidney excretes these in common with other impurities, and that a lightly damaged cortex means not only a better excretion, but a lesser absorption of toxin. Urinary analysis, from which we can infer the amount of kidney lost, still remains of the same importance as before.

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[1] Butler and French, *Trans. Path. Soc. London*, 1902, vol. liii.

But men talk much of what they know little. And in this respect toxins are no exception. We have not even a testing acquaintance with them. If we want to forecast a patient's chances we still have to follow the old lines, and to ask to what dangers is he open, and what signs are there that they are at hand.

Young persons with chronic nephritis die in two ways. Some die with great dropsy, and these have usually slight convulsions or none. They die of exhaustion. Others die with convulsions, and these have usually little or no œdema. In the first, the kidneys are large and pale; in the latter, as Rose Bradford noticed,[1] they are contracted and granular. I do not find that the two varieties differ in their cause when the cause is known; nor do I think we can tell at the first which form of degeneration—for they are alternative, not consecutive—the kidney will take on. But it is always a bad sign when dropsy cannot be removed. Of the onset of uræmia there is much less warning. A high blood pressure—over 150 mm. of Hg by a Riva Rocci sphygmo-manometer—is the best indication; but it is not always there, and it certainly may mean other things. Pressure is often very high in the dropsical cases without convulsions. The worst sign of all is abnormal diminution in the amount of urine.

But in such a case as I have quoted, where no such indications are to be found, why should we suppose that the disease will rapidly progress. Many such a patient does not die till over 40 years of age, and the length of his life depends largely upon his income. If he has to accept what civilisation sends him in cold, hunger, and foul air, he will quickly get fresh attacks of inflammation, will lose more and more of healthy tissue, and will soon succumb. But if he is able to place himself in better conditions he may long postpone death.

Of such, climate is the chief. Nephritis is a disease of temperate zones. I do not know about the North Pole, which is of the less consequence, as patients do not wish to go there; but it is recognised that tropical climates shift the spot of less resistance to the intestines. What in England gives us nephritis or bronchitis, in India causes diarrhœa.

In English hospitals, cases of nephritis are more common in autumn and winter than in warmer weather. To avoid an English winter is therefore a great object. But it is of no use to send patients to the Riviera. The sudden variations of the climate there are dangerous. The north coast of Africa is not much better. Even Biskra, far inland, is cold in winter, and it is a freezing journey to get there. Still, Biskra is much drier and more sunny than the coast line, and gets warm much earlier in the year. In the inner parts of Egypt it is possible to pass a warm winter, but it is not so bracing. I have known Grand Canary sunny, warm, and dry through the winter, but it is not so always; and the long sea voyage is bad for a patient with renal disease.

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[1] *Lancet*, London, 1903, vol. i. p. 1.

The second point is diet. Although the percentage of albumin is still a valuable piece of information, its reduction is no longer the single aim of treatment. Still less is this carried out by the removal of flesh from the diet. It is on the one hand recognised that the general health suffers by too strict an asceticism, and on the other that albuminuria is not increased by a diet of fish or of meat. Even if it rises for the first day or so, and it does not always even do that, it quickly sinks again. But an impression still remains that flesh diet is more dangerous than fish, and fish than milk, either on the ground of their respectively greater content of salt, or from the belief that these proteids contain some nitrogenous extractives which are harmful to the system. It is common to forbid soups and broths, and I have seen the death of a patient ascribed to eating the wing of a chicken.

Of course medical opinion both forms and is formed by lay opinion, and just now the attention of the public is concentrated upon its alimentary canal. I occasionally meet members of the modern Order of Ruminants, and it is rare to have a dinner-party without finding a vegetarian or a fruitarian—an Aryan heretic of some kind at any rate—for whom a special trough must be provided. Each man wins his own heaven. But there is a certain truth underlying these exaggerations. No one will give meat food in acute rheumatism. Some cases of chronic rheumatism, and of rheumatoid arthritis, are greatly benefited by leaving off meat. In migraine it sometimes acts like a charm. But I have never seen anything to lead me to think that chronic nephritis is benefited by abstinence from meat, or that meat has any bad effect upon it. On the contrary, I am quite sure that the reverse is the case. Patients who seemed to be going down hill, to be growing paler and weaker, and to be losing both appetite and flesh, are often much improved by a more generous diet. In this country meat suits most people best, and I do not think that what makes meat harmful to rheumatism or migraine, harms ordinary constitutions, or cases of nephritis. It is a special quality, and has no general application.

Even with alcohol and condiments I am convinced that abstinence may be pushed too far. Alcohol is of no benefit, perhaps may be always a little harmful, to the kidneys. But if appetite fails, the harm is much greater. Digestion, and good digestion waits on appetite, is the chief thing in all chronic diseases. But while in most of them the quantity of food is limited only by its effect on digestion, we have in nephritis to consider something else as well. We have to remember that in this disease the arrangements for the removal of refuse are not of the best, and to limit the intake to the amount which the drain pipes can carry off. Most people eat about twice, or if Chittenden's analysis hold good, five or six times what they need. Their daily quantity can be greatly lessened without their losing weight. The treatment of chronic nephritis even in the young should aim rather at a general moderation than at special abstinences.

The third question is the mode of life. Shall such a patient as mine, who loved hunting and tennis, and generally preferred to give her higher nature a rest, be debarred from all life's pleasures, and ordered to solace herself with contemplation? It is a great penance, and I do not think it is necessary. Fatigue is bad, chill is worse. They must not get tired out, nor wet through, nor stand in draughts when they are hot. But with common sense pleasures can be taken in moderation short of this. And to preserve health they must have fresh air and exercise. It seems to me best to treat this question in the same way as diet. They must recognise that they are on a lower plane. They have not the reserve of power which they had, nor can they draw on so large a balance. It is not, however, that each pleasure is to be avoided, but that it must be taken short of satisfying. They must learn to leave off hungry. One thing I except, and that is dancing. But the reason is not so much that dancing is bad, as that, first, no one who really cares about it can stop when they should, and, second, the attendant circumstances, hot rooms, cold night air, and the rest, are the most dangerous conceivable. In other things I do not believe in coddling.

ANTISEPSIS AND ASEPSIS IN THE TREATMENT OF ENTERIC FEVER.

By Claude B. Ker, M.D., F.R.C.P.Ed., *Medical Superintendent of the Edinburgh City Hospital.*

At a time when the researches of Chantemesse have been rewarded by the discovery of an antitoxic serum for the treatment of enteric fever, it would at first sight appear somewhat unnecessary to write on therapeutic methods which at no distant date are likely to be supplanted by a really scientific treatment. It appears beyond question that the death-rate of the cases treated by Chantemesse with his serum has been very much lower than that of other cases of enteric fever in Paris, treated during the same period on traditional lines; and if further experience confirms these good results, and the preparation is put upon the market, it will undoubtedly be our duty to give it a fair trial.

But in the meantime, at all events, this serum is unobtainable, and none of the other so-called antitoxic or bactericidal serums which have been on sale have much to be said in their favour. I have had personal experience of one of these, the antityphoid extract introduced by Jez, and I am bound to say that I saw no improvement follow its use in the dozen sharp cases in which I employed it, although Eichhorst appears to have obtained the satisfactory results claimed by its author for this method of treatment.

Until, then, a reliable serum is available, we must treat our enteric fever patients by one of the methods which are at present in vogue. We have a wide choice. First, there is the expectant symptomatic method, rightly called agnostic, which consists in dieting the patient appropriately, supporting his strength, and dealing with dangerous symptoms as they may arise. Secondly, there is the treatment which is usually termed antipyretic. Antipyresis by drugs is at the present time rightly discredited, although it still is practised largely in France, and, it is to be feared, by many medical men in general practice in this country. Putting aside the fact that the pyrexia is probably for the benefit of the patient, the use of the coal-tar antipyretics, at one time so much in favour, actually retards the elimination of toxin, and the toxæmia is therefore likely to last longer and to be more severe. Antipyresis by the cold bath method stands upon quite a different footing. Its success has been doubtless due to the fact that it favours the elimination of toxic substances both by the kidneys and by the skin, for it both promotes diuresis and at the same time keeps the skin in good order. Its tonic effect is, moreover, undoubtedly beneficial. But, in the first place, it has never found favour in this country as a system; and, secondly, there are signs that it is losing ground elsewhere. In the latest edition of Brouardel and Thoinot's monograph upon enteric fever, we observe that the authors, while fully admitting the success of Brand's method, consider it should be exclusively reserved for the treatment of very severe cases, which is, in reality, saying that while the cold bath occasionally may be of the greatest therapeutic value, which no one would venture to deny, its systematic use according to the formula of Brand is unnecessary. It is, in any case, a method of treatment which is often disagreeable and always troublesome. It moreover requires a larger nursing staff, and is therefore expensive. It appears to me that if, in adopting any special method of treatment we always keep before us the fact that the success of the bath treatment depends on free diuresis and tonic effect, we may take means to secure its advantages for our patients, and to avoid its hardships.

ANTISEPTIC METHODS OF TREATMENT. — Leaving, then, the expectant and the antipyretic methods, the next to claim our attention is the antiseptic, and it is this method and its variations which I desire to discuss. We may attempt to secure antisepsis and asepsis by a variety of methods, and one of these may be treatment by various antiseptic drugs. On the other hand, we may endeavour to secure a clean bowel by a diet carefully calculated to leave little or no residuum, as recommended by Ewart in a most interesting and suggestive paper which has recently appeared. And, lastly, we may try to attain the same object by the combined use of aperient drugs and copious enemata.

We no longer believe with those who first introduced the use of antiseptic drugs, that we can attack successfully the bacillus of Eberth in the intestine—or that we can to any great extent counteract its toxins in the blood. For, in the first place, the bacillus so soon obtains a nidus in the mesenteric glands and in the other organs of the body, that it is impossible to conceive that any local antiseptic treatment could be started early enough to influence the course of the fever; and, secondly, it is highly improbable that we could so impregnate the blood with any soluble antiseptic as to either obtain a bactericidal or an antitoxic effect, unless the drug employed was of a peculiarly harmless nature, and could be used in very large quantities. On the other hand, we may reasonably expect to secure a considerable antiseptic effect on the contents of the bowel, and to delay or check putrefactive processes which under ordinary circumstances would result in the evolution of gas, and the consequent production of meteorism, and in increased septic, in addition to the ordinary toxic, absorption. We may also hope by the use of some general antiseptic to check the multiplication of bacilli in the blood itself, if indeed any growth does take place there. For any real specific action, we must, of course, wait for an antitoxic serum.

If we can in reality secure a certain diminution of the putrefactive processes in the bowel by these drugs without at the same time injuring the patient, then I think much has been gained. Ulceration in typhoid fever is not a necessary process. We know that many patients escape it. Surely it is much more likely to occur in the presence of fermenting and putrefying matter than in a bowel in which these processes are reduced to a minimum, either by the use of drugs or by some other method. The idea is at least a clean one, and has much to commend it. But, putting the question of ulceration aside, it has always appeared to me that the temperature of an enteric patient depends often on two factors—the first, the toxic factor, with which at present, for the want of a serum, we are unfortunately unable to deal; the second, the septic factor, which, if not attended to, causes a superadded pyrexia by absorption of septic material from the gut. I find the great majority of my patients average a degree to a degree and a half lower within forty-eight hours of admission. And this improvement, while partly due to proper nursing, is, in my opinion, chiefly due to the attention which the bowel always receives during the first two days the patient is in hospital. Thereafter the fever runs its ordinary curve according to the day of the disease on which the patient has been admitted; but my contention is that, without the care taken to secure the comparative cleanliness of the bowel, the temperature would average the degree or so higher with which the patient was originally admitted. The mere height of the pyrexia is to my mind a detail in this connection. It is its cause which we must try and combat. And it is, I firmly believe, partly caused by septic absorption, and a lowering of temperature would indicate that this septic absorption has become less, which can only be for the benefit of the patient.

Antiseptic Drugs to secure the "Clean Bowel."—There is no doubt that the somewhat extravagant claims made by their originators for many of the drugs which are classed as intestinal antiseptics have done the reputation of these drugs considerable harm. It was soon found that they did not work miracles. Cases continued to bleed, to perforate, to relapse, and to die very much as they did before the introduction of these remedies. And many would take the view of Osler, who states he has no faith in intestinal antiseptics, and limits his discussion of this subject, in the article on typhoid fever in his text-book, to this single remark. But in our attempt to attain the ideal of the "clean bowel" in our treatment of enteric fever, we must not lightly despise certain drugs because they were supposed to be going to work miracles and have failed to do so. We may well profit by the study of what they were in reality found capable of effecting, and I think, therefore, that I may be pardoned for giving the experience which I had of these remedies some ten to twelve years ago in the Edinburgh City Hospital, at a time when they were more or less in fashion. The publication of these results may be a little belated; but that great master on the subject of typhoid fever, Louis, has justly remarked that "La Thérapeutique doit tout attendre de l'observation," and I think these observations, made ten years ago, are of a certain amount of value even to-day, changed though our views may be.

Dr. Muirhead was at that time visiting physician to the City Hospital, and was good enough to allow me to take notes of his cases. The cases were dieted chiefly with milk, chicken tea, and occasionally light farinaceous foods. The only special feature about their management was the fact that the feeding in early convalescence was very liberal. The first drug we used was salol, as recommended by Cahall, Church, and many others. This should be an ideal intestinal antiseptic in enteric fever, as the drug is not decomposed till it reaches the lower part of the ileum. On the other hand, its decomposition depends on the activity of the pancreas, and it is quite possible that in severe cases of the fever this activity may be impaired. I was personally only able to watch about thirty cases, treated with 15 grs. thrice daily, though the treatment was given an extended trial in the hospital. In many instances the stools were certainly improved, but the duration and intensity of the fever were unaffected. I do not think it is as effective as naphthol or guaiacol, and it has the disadvantage of being certainly much more toxic. The treatment by chlorine water and quinine advocated by Burney Yeo was also extensively used by Dr. Muirhead, and gave fairly satisfactory results, though here again the duration of the fever seemed to be unaffected, while the deodorisation of the stools appeared to me to be less complete than in cases treated with salol or other antiseptics. This treatment, however, owes its success partly, if not entirely, to the tonic doses of the quinine, which may or may not act also as a general antiseptic. Foord Caiger speaks, on the whole, favourably of it, and it has the merit of being perfectly safe.

Of other drugs which we used at this time I may mention the salicylate of bismuth, given either alone or in conjunction with salol or naphthol. The latter combination has been especially recommended by Bouchard. But the drug is too constipating to be recommended as an antiseptic for systematic use, and might with advantage be reserved for cases of fetid diarrhœa.

While as regards the above-mentioned remedies I have to rely mainly on my impressions, I have detailed notes of those which I am now about to mention. For a year I took daily notes on all the cases of enteric fever admitted to the hospital, and paid especial regard to—(1) Effect on duration of fever, (2) effect on stools, (3) effect on meteorism, (4) effect on tongue, (5) effect on the occurrence of ulcerative accidents, and (6) effect on relapses. As regards the question of temperature, I may say that no antipyretic result, either transient or permanent, was noted which could be attributed with probability to the use of these drugs.

I admit the number of cases is ludicrously small. But it must be understood that my conclusions are not influenced by the percentage mortality of these cases. I have judged the merits of the drugs on their average success as regards the points mentioned above. The cases were not selected. It was settled by a regular routine before the arrival of a patient what treatment he should have, and the various methods were used throughout the year and at all periods of the epidemic. The drugs used were the naphthols (beta-naphthol, hydro-naphthol, and benzo-naphthol), carbonate of guaiacol, thymol, and calomel. A few cases were also treated with the perchloride of mercury and with turpentine, but too few to be of any real value. Both these remedies, however, have a very marked effect on meteorism, and will be found very useful in the treatment of that complication.

My results with the naphthol group were published in detail some years ago. I may say that I believe beta-naphthol to be the most efficient of the intestinal antiseptics. It can be given in doses of from 6 to 9 grs. every four hours throughout the fever; and, in spite of the fact that the urine becomes very dark coloured,—sometimes, indeed, quite opaque,—there is no reason to believe that it in any way damages the kidney. Hydro-naphthol is apparently an impure beta-naphthol, and does not differ from it in action. Benzo-naphthol splits up in the intestines into naphthol and benzoic acid, the last-named substance being excreted by the kidneys. Theoretically, then, the drug should disinfect the urine as well as the fæces. What few observations were made on this point are not worth mentioning, as in those days our bacteriological methods were much less exact than now, and most observers discredit any work undertaken on the subject of typhoid bacilluria previous to 1895.

Our conclusions, then, as regards the use of the naphthols, were that they do no injury to the patient; that they do not affect the duration of the fever; that they modify most favourably the offensiveness of the stools, which in some cases were actually odourless; that they control meteorism to a considerable extent, although in this respect they are inferior to perchloride of mercury and to turpentine. They do not, however, so far as I could judge, affect to any extent the progress of the ulceration. Hæmorrhages were, for instance, at least as frequent. Relapses also occurred; and there was no reason to believe that there was any modification of the pyrexia. So far, then, even with the small number of cases treated,—forty-seven in all,—it is fairly clear that the naphthols exercise no specific action. On the other hand, they are probably useful in checking septic processes. Many a practitioner finds it advisable to prescribe drugs upon occasion, and he will find beta-naphthol a very useful and safe one to employ,—one, it need hardly be added, infinitely safer than the antipyretic remedies which many seem so much inclined to give.

I have had the opportunity of watching a very large number of cases treated with carbonate of guaiacol in doses of from 6 to 9 grs. every four hours. In this particular series, however, their number is limited to twenty-three. With this drug, Holscher claimed to have aborted a certain number of cases. He found it especially useful in cases where the bronchitis was marked. While I am inclined to agree that guaiacol does seem to exercise a favourable influence on respiratory complications, I saw no reason to believe that it really influences the duration of the fever. Its action on the stools, moreover, is disappointing when compared with beta-naphthol, and in only four of the twenty-three cases are the stools noted as "odourless or smelling of creasote." It, however, acts well in cases of meteorism. One relapse and three cases of hæmorrhage were noted in this series.

The next drug to claim my attention was thymol, recommended first by Testi, who considered the drug a safe one to use, and claimed that it modified the temperature and checked putrefactive processes. We gave it in doses of 2 to 6 grs. four-hourly, the average dose being 4 grs. Its chief feature was the wonderful effect on the stools, which lost all fæcal odour very shortly after the treatment commenced. But we found it most disappointing in the prevention and treatment of tympanites, which it hardly affected. The duration of the fever was if anything slightly longer than usual. No ulcerative accidents occurred. There was one relapse. I cannot recommend this drug, as I had the impression that it had a deleterious action on the heart, and in several cases it appeared to cause strangury and retention of urine. Some of the cases, moreover developed irritating erythematous rashes, which I think we were justified in attributing to its use.

Another group of cases was treated with calomel, the method being to give a dose of 3 or 5 grs. every second day throughout the fever. I shall allude to this method of treatment later, as it was this comparative series of cases which influenced me in ultimately adopting the method of treatment at present in use in the City hospital. It is sufficient to say that treatment by calomel seemed to give us better results than any other method. The results of my experience of these antiseptic drugs are noted in the table. Deaths which occurred within forty-eight hours are deducted from each group, as such cases could not be said to have come under treatment. I personally lay no stress on the death-rates of such small numbers of cases. The interest of the series is that throughout the year every fourth admission was treated expectantly, the other three being treated with different antiseptic drugs. Each treatment, therefore, would have the same chance of having severe cases to deal with, if the type of the fever altered with the season. The one point of selection was for the calomel cases. Some children could not be induced to take the antiseptics in wafer paper or otherwise, and when this happened they were treated with calomel. This has materially reduced the average age of the calomel-treated cases, and we would therefore expect the results of that treatment to be better, as indeed they are.

TABLE I.

	No. of Cases.	No. of Deaths.	Average Age.	Percentage of			
				Hæmorrhages.	Perforations.	Relapses.	Deaths.
Expectant symptomatic . . .	51	6	16	7·8	0·0	9·8	11·7
Naphthols . . .	47	0	18	10·6	0·0	8·5	0·0
Guaiacol or thymol	54	3	17	5·5	0·0	3·8	7·4
Calomel . . .	43	0	11	0·0	0·0	2·3	0·0

Still many severe adult cases were treated with calomel, and, in spite of the average age favouring it unduly, I regarded it at the time as being in reality the most successful of the remedies employed. I may also note here that the expectant symptomatic group was distinctly unlucky, and seemed to get more than its fair share of severe cases.

The general conclusions arrived at after studying these antiseptics were that, with the doubtful exception of calomel, they had no effect on the duration of the fever. The calomel cases ran a shorter course than the others on an average, but as the average age was lower I would lay no stress upon that point. Further, these drugs did not stop the occurrence of relapses. After all, there is no reason why they should, as I am not one of those who believe that the cause of relapses need necessarily be sought in the bowel. But this was one of the advantages at that time claimed for them. That the putrefactive processes were lessened, if the odour of the stools is any guide, was a fact beyond question. Their effect in diminishing meteorism points in the same direction. The occurrence of hæmorrhage may have been diminished, but, as pointed out above, the expectant symptomatic group was distinctly unlucky. The fact that no perforation occurred in nearly two hundred consecutive cases appears remarkable, but one of the eight deaths which occurred within forty-eight hours was from this cause, and, as mentioned above, these deaths have been deducted.

Of several other antiseptics, general and local, I have not had sufficient experience to speak. Carbolic acid has had its supporters. Cash, Quill, and others have highly praised it. Pope, on the other hand, did not regard it as efficacious. I should personally consider it as too toxic a substance to use with any freedom. Oil of cinnamon is well spoken of by Foord Caiger. I have so far not used it. Acetozone is another much vaunted remedy. I have only treated a few cases with it, and all I can say is that it, like so many others, performs no miracles. The experience of Wasdin, of Harris, and of Abt and Lackner points, however, to it being a really effective antiseptic agent. At present one of its great drawbacks is its price. Another drug, which I have always determined to try, is acid sulphate of soda, which is given by M'Cormick, who claims to have obtained very good results with it. Cannaday, who has treated eighty-five cases with this substance, also strongly believes in it.

There are, of course, many other drugs which have been used as specifics, or antiseptics, notably sulphurous acid, as recommended by Wilks. The very number of remedies suggested is a proof of our inability to really control the fever by medicinal means.

Attempts to secure Asepsis.—Just as in surgery the antiseptic method was supplanted by the aseptic, so in the treatment of enteric fever the tendency has been in the same direction. The object in this case is to so diet the patient that the bowel is rested as much as possible, and that little or no residuum is left to ferment and putrefy. A treatment more or less on these lines is that recommended by Queirolo, who advises that feeding should be entirely rectal, a lemonade made with hydrochloric acid being the only drink allowed. The rectal feeding is preceded by an irrigation of the bowel with boracic acid. While no doubt this treatment was devised to rest the bowel, rather than to render it aseptic, it is probable that Queirolo's successful results were largely due to the latter effect.

Another interesting method is that recommended by Williams, who also with a view of resting the bowel practises what may fairly be called a system of starvation. Believing that the exhausting diarrhœa of typhoid is due to improper feeding, his object is to keep the bowel empty. This he does by giving in some cases nothing but water for days at a time, and he regards half a pint of milk in the twenty-four hours as a liberal diet, seldom apparently exceeding this amount until the temperature reaches the normal. The method seems drastic, but the interesting point is that the cases most undoubtedly do well, as those who know the Southern Hospital at Liverpool can testify. I have often marvelled at the amount of starvation which a typhoid case can safely tolerate after a hæmorrhage, and it is only rational to suppose that the cases would support starvation even better before such a depressing complication had occurred. In addition to this low diet, persisted in for three weeks after the temperature has become normal, Williams believes in the use of half-grain doses of calomel, or two-drachm doses of castor oil, to move the bowels. Under such a régime he probably more nearly attains the ideal of the clean bowel than any other observer. It seems almost incredible that patients so treated should occasionally gain in weight, and that they do not in any case waste more than patients more liberally fed; but it is after all obvious that, if food is not assimilated, there is no benefit to be derived from it, and in many cases of enteric fever assimilation is remarkably poor.

The theoretical objection to both these methods of treatment is that if ulceration has once started, such a low diet would apparently give the intestinal lesions only a poor chance of repair; on the other hand, the absence of irritation would go far to counterbalance this defect, and, as has been said above, the patients seem to stand their starvation remarkably well. If plenty of water was supplied this would be more easily understood, but some of Dr. Williams' patients were limited, for a time at least, to one pint per diem, which seems a most inadequate amount.

Ewart, while endeavouring to secure a clean bowel, believes in feeding fairly liberally, such food as leaves little or no residuum in the lower part of the ileum being selected. "Plenty of food and no fæces" is his motto, and his dietary consists of peptonised whey, well salted, and given to the amount of two and a half pints in the twenty-four hours. This is afterwards supplemented by cream, by sugar, by eggs, and by vegetable broths and fruit jellies. This diet is certainly thoroughly scientific in principle, and is well worth an extended trial. It leaves little or no residuum. Ewart does not claim that his treatment is aseptic; indeed, he calls it antiseptic; but it appears to me that the term "aseptic" may be perhaps applied to a method which has as its object the banishment from the bowel of substances which *may* become septic, and not the disinfection of substances which *have* become septic. It is, however, the case that he gives one-eighth of calomel every six hours, and also prescribes 2 drms. of liquid paraffin every four hours as a lubricant for the bowel, and in order to exercise a healing effect on the ulcers. Charcoal is also given freely, and Ewart firmly believes in its use, although much doubt has been cast on its disinfecting value, when moist, by other observers. The suggestive part of this treatment is to my mind the dietary, which certainly appears to be very sound and on the right lines.

ANTISEPSIS BY ELIMINATION.—For want of a better name I would describe the treatment I have used for the last five years in the Edinburgh City Hospital under the above heading. It consists in the use of aperient doses of calomel every second or third day, supplemented by irrigations of the large intestine with hot water. The diet is chiefly milk, and the patient is encouraged to drink water freely. While I have every reason to be satisfied with the result, I am not prepared to say that, with the dietary suggested by Ewart, its success might not be greater.

Calomel.—The use of calomel in enteric fever has been approved of by many observers, from Liebermeister downwards. Its traditional employment has been to empty the bowel in the early days of the fever, and when the patient first comes under observation. But it has not been used to any great extent during the whole course of the fever, except merely as an antiseptic in fractional doses. Foord Caiger in his Bradshaw Lecture states that he has found it causes in many cases diarrhœa and colic, and if that is the case it would certainly be enough to condemn it. But after many years' experience of it I can say with complete confidence that, when used in conjunction with irrigation of the large intestine, these bad results are not in the least likely to occur. So far as I can judge, calomel, in doses of 3 grs., empties the small intestine into the large. If, about six hours after the drug has been given, the large intestine is thoroughly washed out with from 3 to 5 pints of hot water, the patient suffers from no discomfort either at the moment or afterwards. I can quite believe that colic might occur if the irrigation was not given, for I have often noticed that a motion cannot be counted on, even after a 5-gr. dose, unless an enema is given. This applies to patients in bed. Calomel may act very strenuously on persons who are up and about, and in the healthy it often causes great pain and discomfort. But I never wait nowadays to see what will happen if the patient is not assisted by an irrigation. It is always ordered as a routine not later than seven hours after the calomel has been taken.

It will be seen, then, that the object with which the calomel is prescribed, in what may be even called purgative doses, is to prevent any stagnation of fermenting material in the ileum. I used to regard the increased excretion of bile as being probably useful for antiseptic purposes, but latterly the supposed antiseptic function of the bile has been disproved; so I can no longer claim it as an adjuvant to the treatment. On the other hand, the calomel has considerable antiseptic action on its own account. While it is not claimed that it has any specific action on the bacillus of typhoid, the researches of Wassiljeff (I have, most unfortunately, mislaid the exact reference) go to prove that it has really a marked effect in limiting the multiplication of the organisms of putrefaction in the gut. The objectionable matter once removed from the ileum, it is not allowed to remain and to irritate the large intestine, but is at once washed out.

I have now a consecutive series of 758 cases treated on these lines, and before going into details on the subject of irrigation, and discussing the diet given to the patients, I would point out that, in my experience, the alleged dangers and disadvantages of calomel have not been noticed. As regards pain, the evidence of the nurses in charge and my own observation lead me to the definite conclusion that it is seldom or never complained of. As regards diarrhœa, if it exists on the patient's admission, it quickly disappears under the influence of a suitable diet and the washing out of the large intestine. I believe it is also most favourably influenced by the use of calomel, and I have never seen diarrhœa actually set up by the use of the drug. The next point of interest is the effect of calomel on the ulcerative complications. Does it predispose to perforation? Does it increase the liability to hæmorrhage? So far as perforation is concerned, the incidence of that dreaded accident in this series of cases was well under 2 per cent. This is a very usual figure, and is somewhat less than the average. Murchison found that slightly over 3 per cent. of his cases perforated, Griesinger 2·3, and Curschmann 2·2 per cent. In a preceding series of 397 consecutive cases of my own, in which calomel was not used, 3·2 per cent. of the patients perforated. We may therefore conclude that the systematic use of purgative doses of calomel does not increase the frequency of this accident.

As regards the liability to hæmorrhage, the question is not quite so easy to answer. The percentage incidence of bleeding in my cases was 8·04, a figure which appears large when compared with the statistics of others. Thus Murchison found that 3·77 per cent. of his patients had what he terms "copious" hæmorrhage, that is, a loss of over 6 oz. of blood. I am absolutely certain that, if I made such a distinction, I would find my hæmorrhage rate lower than his, for not more than a third of my cases had hæmorrhage to that amount. I have always been in the habit of classing as cases of hæmorrhage those in which blood, in greater or less amount, is present in the stools. In some cases the amount has been extremely small. Fortunately, however, I have for purposes of comparison the series of 397 consecutive cases mentioned above. In this group of cases the percentage incidence of hæmorrhage was 8·06, as against 8·04 in the calomel series. No figures could agree more closely, and I think I am justified in concluding that the systematic use of calomel, on the lines which I have described, certainly does not increase the liability to hæmorrhage.

When I first used calomel, some eleven years ago, the usual dose employed was 5 grs. for an adult and 3 grs. for a child, given every second or third day. It will be noticed on reference to the table in the earlier part of this paper, that of forty-three cases not one either perforated or suffered from hæmorrhage. To show how the purgative doses were continued right through the fever, usually, indeed, as long as the pyrexia lasted, I quote here a few notes from my records.

Male, æt. 20—Calomel, 5 grs. on the 15th, 17th, 18th, 20th days of the fever.
,, æt. 34—Calomel, 5 grs. on the 12th, 16th, 18th, 20th, 22nd, 25th, 27th, 29th days of the fever.
,, æt. 46—Calomel, 5 grs. on the 19th, 20th, 22nd, 25th, 31st, 36th days of the fever.
,, æt. 17—Calomel, 5 grs. on the 22nd, 23rd, 26th, 28th, 30th, and 3 grs. on the 32nd, 35th, 38th days of the fever.
,, æt. 7—Calomel, 3 grs. on the 5th, 6th, 7th, 8th, 9th, 11th, 13th, 15th, 18th, 20th, 22nd, 23rd days.

These instances could be multiplied indefinitely so far as 3-gr. doses are concerned. I obtain all the effect desired with the smaller dose, and no patient in my last series of cases received more than 3 grs. I may almost say that no patient received less, for children take calomel so remarkably well that I use the 3-gr. dose for them also, except in the case of children under 3 years of age, when I am content with 2 grs. or less. But the point is that the figures given above show that even 5-gr. doses of calomel may be given throughout the ulcerative period of the fever without damage to the gut.

It is, of course, obvious that the use of calomel is sometimes contra-indicated. The system is not to be considered a hidebound one. Very marked meteorism is a contra-indication. If the abdomen is so ballooned that it is alarmingly tense, I order a simple enema first, or perhaps a small irrigation, before using the drug. Indeed, this is done as a routine on the admission of patients to ascertain the condition of the stools. Calomel is apt to slightly and temporarily increase any existing meteorism before the irrigation is given. After the irrigation the abdomen is usually quite soft, and often flat. If the abdomen is dangerously tense, it would be obviously undesirable to increase the inflated condition of the gut in the least. But twenty-four or forty-eight hours after admission the meteorism has been usually sufficiently modified by diet and by enemata to make calomel safe to use. And in that case I know no treatment which reduces meteorism more rapidly.

Again, if the result of the first enema has been to show that there is blood in the stools, it would be little short of insane to disturb a bowel which obviously requires perfect rest, if further hæmorrhage is to be prevented. Lastly, if the temperature is running in an almost straight line with no remission,—a condition of affairs which is often associated with deep ulceration and a threatened hæmorrhage or perforation,—it is well to be cautious. Probably a third of the hæmorrhage cases in my series had no calomel given to them at all, and the same applies to the perforations. Only once in all these cases have I seen hæmorrhage occur on the day on which calomel was given.

It might be fairly asked whether mercurialism does not occur in cases treated so freely with calomel. It never occurs, the reason no doubt being that, the dose given being an aperient one, the drug assists in eliminating itself. The washing out of the large intestine probably also assists in preventing much absorption of it. On the other hand, I remember when I first used calomel in enteric fever, I followed the methods then in vogue of small $\frac{1}{2}$ or 1 gr. doses two or three times a day, and have seen the gums touched in a very short time in such cases.

Irrigation of the large intestine.—Our method of irrigation is to allow 3 to 5 pints of hot water to slowly enter the bowel from a douche can raised only slightly above the level of the patient. The water is previously boiled, and is at a temperature of about 116° to 120° F. in the can; but as the process is a slow one, and there is a large amount of rubber tubing, it is several degrees lower when it enters the bowel. The patient lies with the hips raised, and on the left side. A change to the right side after a couple of pints or so have entered, often allows the amount introduced to be more readily tolerated. The largest amount I remember giving was 6 pints; a very average irrigation would be between 3 and 4. The patient retains this amount of fluid for as long as he can, and then passes about two-thirds of it. A second motion is occasionally passed later.

While the object is chiefly to remove any fæcal matter and to make the bowel as clean as possible, an advantage is also gained from the fact that a certain proportion of the fluid introduced is absorbed and is returned by the kidneys. This is useful, especially in toxic cases, where it is often difficult to make the patient drink nearly enough water. There is no doubt that the patients feel very much the better for the irrigations, and they not infrequently demand them at times when they have not been ordered. In cases with much meteorism I occasionally prescribe two daily. Only once in this series of cases have the washings of the bowel after an irrigation contained blood, the first "show" of a smart intestinal hæmorrhage.

My attention was first drawn to the use of large enemata by the paper of Buchman, who found that 6 pints of water can be easily passed into the colon, and that putrefactive fermentation is thereby lessened and tympanitic distension disappears. Buchman, however, used cold water with a view of lowering the temperature. A considerable antipyretic effect can most undoubtedly be secured by these means, but I have a vivid recollection of a dangerous collapse in a patient so treated, and in any case I do not believe in interfering with pyrexia, except so far as we can treat its cause. Shuell also recommended irrigation in enteric fever, with a view of removing all decomposing substances. He used a soft rubber tube 3 ft. long, and suggested about 4 pints as a suitable amount. His method was to flush the colon in this manner with warm water every three days during the first fortnight of the fever, but considered that caution should be used towards the end of the disease, on account of the possibility of deep ulceration of the solitary glands of the large intestine. I have personally found that this risk is more theoretical than real, as, although I irrigate throughout the fever, no case of perforation of the large intestine has occurred, and in any case we keep the large bowel so clean that there is, I think, very little chance of deep ulceration occurring there. Neither of these observers noted the increased diuresis, which I regard as a usual consequence of this method of treatment, and one of its chief advantages.

Diet.—And now as regards diet. This series of cases was fed chiefly on milk, supplemented by chicken-tea or beef-tea, and in prolonged cases by chicken-jelly, plasmon, and occasionally egg-flip. The diet is always increased rapidly from the moment the morning temperature touches normal. From that time boiled bread and milk is added, two or three days later white fish, and by the sixth day of apyrexia the patient is usually eating chicken. We have not, I may add, a high percentage of relapses.

I am well aware of the limitations of milk as a food in enteric fever, but it is satisfactory enough in the vast majority of cases if it is carefully given. I always believed in diluting it freely with warm water, and in giving it in comparatively small amounts at frequent intervals. I owe, however, to Professor Wyllie, for five years consulting physician to the hospital, the strict rules which we now lay down regarding its administration. The milk is given, one-third diluted with hot water, every two hours, and the great point of the system is that it must be taken and finished at once. It is never left at the bedside. We therefore secure a rest for the patient's stomach, and there is no chance of milk being sipped and passed on in an undigested condition, with the digested milk already in the stomach, into the small intestine. Water, of course, always stands at the bedside, and is pressed on the patients. As regards the amount of milk given, I have for some years seldom exceeded 3 oz. every two hours. This is well under 2 pints in the twenty-four hours, and I consider few persons can adequately digest more, even under the conditions noted above. I regard typhoid diarrhœa and many bad symptoms as chiefly due to milk given either improperly, as when, for instance, the patient is allowed to use it to quench his thirst, or in too large an amount. I strongly object to seeing even the smallest specks of curd in a stool, and in such cases promptly cut down the milk by half an ounce or 1 oz. every two hours.

Beef-tea and chicken-tea may not be foods, but given hot they are, as Professor Wyllie still points out to his class, excellent stimulants and hypnotics. They also are a useful medium for providing salt in reasonable quantity to the patient, and are always much appreciated. Cases, moreover, fed on the lines indicated above, are, after one or two days' treatment, much more likely to suffer from constipation than from diarrhœa, and the laxative action of the beef-tea tends to keep the bowels more regular. Should diarrhœa persist,—a condition I hardly ever see,—raw meat juice or some meat extract may be given instead.

As regards other points in the general treatment of these cases, I may say that we seldom use alcohol, and if it is used it is given in very small amounts at first, perhaps even a drachm four-hourly. The effect on the pulse and on the patient is carefully noted, and if there is no improvement the stimulant is not persisted with. Some patients, of course, do very well with stimulants, but my experience is that the vast majority even of sharp cases are far better without them. As regards hypnotics, I believe in treating insomnia at once, and never allowing a patient to have two practically sleepless nights. Chloral and bromide have given me, on the whole, the most satisfactory results, and the hypnotic, once started, is always pushed till sleep is procured. Otherwise more harm than good has been caused by its use.

Water in enteric fever.—Latterly I have more than ever forced water in large quantities on my patients. In the present series about 3 pints a day, in addition to fluid foods, would be given on the average.

But my present ideal is to see that, if possible, they take 6 pints, which with about 4 pints of other drinks would mean 10 pints of fluid in the twenty-four hours. It makes the nursing very heavy, but amply repays the extra trouble. The blood is, so to speak, washed out and the excretion of toxins much assisted, while delirium rapidly disappears. Débove of Paris has succeeded in getting patients to take 7 or 8 litres a day. This I have never attained to. More recently Cushing and Clarke have published an interesting paper, in which they state that a gallon of water a day is tolerated by most patients, and that in some cases a gallon and a half was given. A remarkable polyuria was set up by this treatment, and the authors speak enthusiastically of their results. Sollmann and Hofmann, in a supplementary paper on the same cases, conclude that there is a tendency to retention of chlorides in enteric fever, and that under this treatment their excretion is increased. No accumulation of fluid, it is said, occurs in the body.

GENERAL CONCLUSIONS.—And now a word as to the comparative results of this treatment. The death-rate was 9·36 per cent. of the total cases. In calculating this percentage, no deductions are made of cases which died within twenty-four or forty-eight hours. Such moribund cases were occasionally admitted, but although they never, strictly speaking, came under treatment at all, they are all included.

TABLE II.—*Record of* 1155 *Consecutive Cases of Enteric Fever.*

Date of Treatment.	Number of Cases Treated.	Nature of Treatment.	Percentage of			
			Deaths.	Hæmorrhages.	Perforations.	Relapses.
May 16, 1897, to May 15, 1900.	397	Expectant.	11·83	8·06	3·27	5·79
May 16, 1900, to Dec. 31, 1905.	758	Calomel and Irrigation.	9·36	8·04	1·71	3·95

Note.—The diet was the same in each series, except that in the second series the patient was fed more liberally in early convalescence. An interesting point is raised by the lower percentage of relapses in this series. This tells against the view, still largely held, that relapses are due to early feeding.

It will be seen that there is no suggestion in these figures that the treatment by calomel and irrigation is in any way unsafe. The ulcerative accidents are not increased. While it may be objected that enteric fever varies very much in severity in different years, I may say that no marked difference in type has been noticeable during the nine years covered by these statistics. Every case of enteric fever admitted to the hospital during that time is included, and the patients were of all ages.

The death-rate compares favourably with that of the other fever hospitals of this country.

What I claim for the treatment is that it leaves the patient free to deal with the enteric fever poisons, and relieves him to a great extent from the superadded septic absorption which, I am confident, plays a great part in a case of enteric fever. The bowel is kept reasonably clean, the meteorism is much reduced, and diuresis is assisted. The elimination of much poisonous matter can only be to the benefit of the patient, and I would conclude that a treatment on these lines, in conjunction with a specific serum, when such is obtainable, would be the most rational to use in cases of enteric fever.

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AN INTRODUCTORY LECTURE DELIVERED AT THE INAUGURATION OF THE CHAIR OF CLINICAL THERAPEUTICS, FACULTY OF MEDICINE, PARIS.

By Professor ALBERT ROBIN, *Paris.*

GENTLEMEN,—The marks of sympathy with which you are kind enough to greet the new course of instruction which the Minister of Education has done me the honour of entrusting to me, have touched me profoundly, and no words can express the feelings of gratitude which I experience on hearing your applause, and in seeing so many of the leaders of science give me to-day the pledge, so precious to all, of their friendship and esteem.

The greater the evidences of favour that you show me, the more heavy do I feel the task which has fallen to my lot. Your courtesy proves that you think me worthy of executing it, while I can only think of the distance which must always separate my goodwill from the object to be attained:

> "Il en est qui jamais n'ont connu leur idole!"

At least, if your suffrages are my most solid ground for encouragement, they impose on me a debt which it shall be my duty to repay, in sparing no pains that the lectures you have to listen to may justify to some extent the confidence which you so generously accord me in advance.

Therapeutics has been justly defined as "the science of the treatment of disease." It includes materia medica, which discovers and describes drugs; pharmacy, which regulates their preparation and uses; pharmacology, which investigates their actions on organs and functions; and finally, therapeutics proper, which, guided by the principles of the preceding sciences on the one hand, and, on the other, by clinical medicine, opposes to maladies a suitable treatment, taking account of their principal varieties, and the indications resulting from the morbid state itself as well as the organic reactions it excites and the soil in which it evolves. All that part of the science which is taught to you by the Professors of Pharmacology and Therapeutics constitutes an indispensable store of facts without the knowledge of which the future doctor is consigned in advance to the grossest empiricism. But, after you have attended all these systematic lectures, even should you have a memory capable of retaining every detail of materia medica and pharmacology, and every indication to be fulfilled in every disease — notwithstanding all this, you would be, in Professor Jaccoud's forcible words, no more fitted to become doctors than when you began. When you find yourself face to face with the sick man, you will probably know some of the terms of the problem, yet you will be unable to solve it, because your mind is filled with didactic clinical types and schemes of treatment, and because the individuality of the patient, the manner in which he takes his illness or reacts to treatment, are so many surprises eluding all anticipatory or conventional synthesis. Then you will experience the anxieties which have tormented all of us, when, armed with our diplomas, the memory crammed with facts, theories, and formulas, we came face to face with our first patients, and felt the frailty of so much hardly acquired knowledge before the terrible responsibility of holding in our trembling hands the lot of a human life. To distinguish the indications which surge up in any particular case of disease so as to adapt to them the treatment required by the exigencies of the patient's personality, there is needed an experience,—I had almost said a virtuosity,—which only those possess who have met hand to hand the innumerable complexities of practice.

Clinical therapeutics aims at overcoming for you these difficulties, at arming you little by little with the experience which, later, you could only acquire at the expense of your patients, at showing you how to pick out the salient therapeutic indication, how to determine with what drug to meet it, its dose, and means of employment. Clinical therapeutics is to therapeutics what clinical medicine is to pathology, and the simplest definition that can be given is, that it is both the science and art of treatment, not of diseases, but of patients. It is a science, because no tact, experience, or even inventive genius can supplant sound knowledge. It is an art, because it can only be applied with a prospect of success by the possessor of that nameless faculty which is developed by experience, and which in the words of Schutzenberger "lets us see things as they are, in the objective reality of the sick organism."

To what impassioned controversies has this question—whether clinical therapeutics is an art or a science—not given rise? Did not Trousseau insist, with all the eloquence of his incomparable authority, that at the bedside the value of science is but relative, and subordinate to the sentiment of the artist, while Claude Bernard considered it anti-scientific to raise intuition and tact to the level of a criterion, or of what philosophers, with Descartes, call evidence. But this tact and intuition, innate though they be in each of us, do they not participate in a scientific education, and is the culture which that gives them not a condition of their development? Does not this culture impress on them an objective character? Is the selection of the appropriate treatment not derived, as well as from the indication and the actions of drugs, from that penetration wrought by experience and even from almost unconscious impressions which determine its choice and execution? —without counting that there are circumstances in which this *quid divinum* gives decisions of which scientific reasoning cannot always explain the motive. Even in matters of applied therapeutics

Pascal's words are true, where, declaring that not every revelation of the truth is the fruit of reason, and using the word "heart" as the expression of an aptitude for feeling and determining by this sentiment alone, he writes this dominating *pensée* of his works: "Le cœur a des raisons que la raison ne connait pas." Two centuries later Claude Bernard could say, "L'homme peut plus qu'il ne sait." Science is valuable only within the range of the judgment that uses it, and this judgment is the expression of the qualities which science ripens, and which the prolonged observation of sick people makes keen. Even in cases where sentiment alone seems to guide the conduct of the doctor, this sentiment has still, for the determinist, a mental deliberation in which science and experience take part, and the chances of its erring are so much the fewer the more science and experience have rendered it acute. No one can be a healer worthy of the name who has not unified in himself the science which furnishes the basis of the judgment, the power and the art of judging which result from the education of tact by experience, and, let me add, faith, provided that it rest on that same experience.

At the word "faith" I hear instant objections. What can faith do in the face of science and reason? But faith is, in some sort, the acquired energy which the forces composed of science, experience, and reason communicate to us. Faith is, as Malebranche says, "le mouvement que nous avons pour aller plus loin." Faith cannot replace inadequate motives, but without it motives will produce no useful work, for it is the inciter of action, and a man does not act unless carried away by the power of a conviction. One of the duties of the Chair of Clinical Therapeutics is to contend against scepticism, which oppresses the mind, and still more the heart, of the physician, and which weighs more heavily on each successive generation. How many physicians you have seen, even among your teachers, who do not believe in treatment. At how many cliniques have you not been present where the chief, after having minutely scanned the diagnosis and depicted the pathology of the disease, has contented himself, as regards therapeutics—"that vain ceremonial" (the expression is M. Bouchard's)—with some trite formula, some treatment of symptoms by whatever drug was in vogue, if, indeed, he were not quite pleased to leave the formality to his house physician. Is not therapeutics banished from the competitions which lead to the highest official places in our profession? Is there a single examination for which a candidate devotes more than his spare time to a cursory study of the subject, not daring to prolong it lest he endanger his chance of success? Once I suffered on this account, and one of the men who most adorns French science, Professor Renaut of Lyons, can tell you that I am not alone in this. Why then investigate a subject not merely useless, but even prejudicial? And when a candidate has been promoted to a teaching post, how can he all at once begin to instruct his pupils in a subject which, during the mechanical ascent through our competitions, he has been led to consider a superfluous accessory?

This deceptive scepticism has nothing in the world to do with philosophic doubt. It is as necessary to divest one's self of the former as it is to exercise the latter, lest we fall into that credulity from which the greatest intellects are not wholly exempt—witness the great Newton discoursing on the Beast of the Seven Horns, and the Jerusalem of five hundred square leagues. Philosophic doubt is that frame of mind which resents the infirmity of man's conjectures, refuses to admit without criticism categorical affirmatives, and, labouring to attain truth, does not rest complacently in the pride of possessing it. It is an analytical process, and an invitation to further advance, while scepticism paralyses the highest of our functions by immobilising the physician in the most dramatic impotence. We must scourge it forth without respite, whether we find it in others or in ourselves, and for this we must seek its causes that we may put them from us, and then try to mark the bounds which ought to limit our beliefs, that is to say our actions, for the two are indissolubly bound up in one another. The causes of therapeutic scepticism (putting aside certain ineradicable mental states) are the conditions which govern medical education, the history of the swing of the therapeutic pendulum, and, lastly, the discouragement which seizes an imagination enamoured of the absolute, when it sees that a malady does not respond with docility to the injunctions of science.

Let us leave on one side the congenital sceptics, and those who, like our old Montaigne, seek in nihilism a shelter from the stormy blasts of opinion. Their case is hopeless; better for them to renounce the practice of medicine and turn their minds to laboratory research. Let us begin by reforming our competitive examinations; impart to them the practical character they lack, and introduce a stringent test, in which candidates must show their capacity to follow out their diagnosis to its therapeutic conclusion. This done, let us throw overboard all doctrines, these admirable means of summing up the thought of a period and the stages by which it has evolved, these detestable features of medical education of which Stoll says, "Nothing great or useful can be made of theories or opinions." They mark all the stages of our history, unceasingly growing of themselves into new formulæ, taxing their ingenuity to bend into hard and fast laws the uncertainties of morbid changes, leading to dogmatic treatment, the worst form of all, since it is founded on the interpretation of facts which our poor logic gives, rather than on the facts themselves. These theories—with what tyranny they have ruled the physician, and how they stifle him still! I ask you to read, not their history, but their romance, in Pidoux's introduction to the "Traité de therapeutique," of which, with Trousseau, he was the author: it will not need more to convince you. But, without discussing the whole topic that these writers have so broadly handled, let us, by way of example, look simply at the treatment of dyspepsia during the last century.

Resuming all pathology in the theory of irritation, stripping diseases of their essentials in the effort to localise them, Broussais made gastritis the keystone in the nosological arch, whence arose an antiphlogistic medication, which soon fell to ruins from its failure. Barras, more of a clinician, saw at the bedside the error of his contemporary; but as he too required some guiding doctrine, he introduced the nervous theory, replaced gastritis by gastralgia. Thereupon, away with antiphlogistics! bring anodynes, sedatives, analgesics; meanwhile the patient, his pain relieved, remains dyspeptic as before. Those who digested worse after this orgie of narcotics were ordered, still in virtue of the theory, a tonic regime. The patient felt no better of this, and the nervous doctrine foundered in a sea of anarchy, when Schmidtmann, one of its apologists, discovered that each remedy had a season when it did good and a season when it did harm, which led him in practice to fall back upon the idiosyncrasy of the subject and the susceptibility of the stomach; in other words, to treat the patient, not the disease. Chomel, understanding this, adhered to the treatment of symptoms, when Beau erected his system, the materials of which are indestructible and their disposition solid, for it was built on a basis of clinical observations. The conception sinned from the first in being too absolute, and then by its too exclusive generalisations. It was a rigid frame, into which isolated cases would not fit, for it regarded the disease apart from the living man. Moreover, it lacked any therapeutic outcome. During its prevalence symptoms served as the only pretext for treatment. Among these ruins, Professor Bouchard, combining the theory of organs with a revival of humoralism, built up dilatation of the stomach, which had for its sanction a rational system of therapeutics, and achieved universal success. But just then came the chemical theory proclaimed by Germain Sée in the celebrated axiom, "Dyspepsias are either chemical or they are not." Which of us has not been dazzled by an hypothesis which seemed to correlate the facts so well, and to install certainty in therapeutics? for now there was nothing more to do than to neutralise acids if they were in excess, or to replace them if they were deficient, and to render the stomach antiseptic if they arose from fermentations.

But it has chanced, once again, that the event has falsified the theory. The malady has slipped away from the medicaments dictated by chemical laws which seemed to guarantee its capture, and now we are assisting at the short-lived dominion of a new nervous theory which reduces treatment to regime and hygiene, possesses at least the merit of avoiding dyspepsia from drugs, allows the sick man to be cured by the suppression of the causes of the disease, but which is in the ultimate analysis nothing but an expectant treatment on which are superimposed diverse symptomatic remedies. And this absence of any real treatment is not the least of the causes of the invasion by the surgeon of a domain which, with but few exceptions, should remain the heritage of the physician.

Although modern discoveries have given a crushing blow to what may be called the philosophic medicine of which Broussais was one of the last and most brilliant exponents, we still see the rebirth of ever-changing theories, under a form more scientific, and therefore more convincing, each time a new means of investigation reveals more of the mysterious events of morbid biology. And not only in medicine do hypotheses show this instability: all the sciences are in the same case. The conception of an atom wavers; the principle of the conservation of energy, absolute until now, is shaken; and M. Poincaré, one of the first mathematicians of the day, admits and affirms that the geometry of Euclid rests on no other basis than convention and observation. At the present time doctrine has lost its former almost speculative character. It proceeds by bacteriology, by chemical analysis, by histology, by physics, or by mechanical biology—by exact sciences, which give it a greater semblance of truth. But at bottom, and although it may disguise itself under the name of a theory, it is naught but an extension of isolated facts, well observed though they be; a vibrating synthesis of elements, whose value depends on the living medium in which they develop, and not on the artificial bonds which reason has woven for them. Thus it is said that therapeutics ought to be founded on pathogenesis and etiology. Discover the cause of the disease, detect the pathogenic series of phenomena of which that is composed: then abolish the cause, and break the links of the chain it has forged. Is not this an excellent riddle to solve? Hippocrates dreamed of such a therapeusis when he said: "If we knew the cause of diseases, we could give what is useful by seeking in the contraries the needful remedy."

But this cause, this succession of pathogenic actions which it engenders, can we always see them clearly enough to state them unreservedly? Do we not know that deductions always intervene, in spite of all we do, in the classification of morbid phenomena, if not in their observation also. Let us suppose, for the moment, that we have wiped all the old theories off the slate: at every step, all the same, we come across fresh theories which are but new wine in old bottles. And even if we possessed well-founded etiological and pathological theories, a prime factor would still remain unknown, and capable of overthrowing the whole edifice, in the manner of reaction of the organism to the cause, and the series of morbid impressions this reaction creates. In order to practise an etiological and pathological therapeusis satisfactorily, the cause of diseases, their pathogenesis, and the modifications which the dynamics of the patient imposes on pathological physiology, must be known, and we are as yet far from understanding them completely.

Moreover, let us follow up these considerations into practice, and see whither they lead. Bacteriology has revealed the cause of pneumonia; chemistry and histology have explained its pathological physiology: in what have they benefited therapeutics, since we still remain in a state of expectation, armed with the feeble weapons of symptomatic treatment, unable surely to discriminate between the defensive symptom which requires support, and the attacking symptom or the exaggerated reaction which must be met and conquered. Do you wish to treat a case of diabetes on pathological lines? Your first difficulty will be to find out the pathogenesis of this diabetes, over which about eight theories are disputing. And even if we select the two opinions which seem to have most supporters,—that of the over-production of sugar and that of its insufficient oxidation,—we nevertheless meet two contradictory methods of treatment, since in the first case the theory implies medication which will diminish glycogenesis, while on the second hypothesis we are driven to a stimulant treatment to accelerate the retarded combustion of the glucose. Should a physician think of treating according to its cause and pathology muco-membranous colitis, his embarrassment will be none the less; for gynæcology claims it as arising from the genital tract, the bacteriologists ascribe it to intestinal organisms and their toxins, whence antiseptic treatment and all its disappointments, the neurologists hail it as within their province, while others attribute it to intestinal lithiasis, to constipation, to hyperchlorhydria, to simple inflammation, to herpetism, or even to the arthritic diathesis. No wonder that, in face of "cures" dictated by all these pathogenic theories,—and still more that all show cases to justify them,—Lasègue can say, "Be the treatment what it may, in the immense majority of cases the disease runs an indefinitely prolonged course, and becomes a humiliation to the doctor, and a perpetual weariness to the patient."

It would be easy, by examples, to show that etiology and pathology are still too often but uncertain guides in therapeutics. But it would be the height of folly not to recognise that if they were known with some exactitude, therapeutics could have no surer inspiration. When we remember that the discovery of the organised nature of infection has reconstructed surgery, root and branch, has transformed hygiene into an exact science, and has done more for the prophylaxis of disease in twenty years than had been done in the twenty centuries preceding, we have the right to hope that this glorious evolution is but the dawning light which will one day illuminate the treatment of disease.

Already, Pasteur has conquered hydrophobia; Roux and

Behring have gained for themselves a glorious halo by rescuing our children—the future of the race—from diphtheria; the success of immunisation against bovine tuberculosis presages its application to man; phagocytosis and the tissue modifications ascertained in the course of infections give us glimpses of some of the most intimate defensive actions of the organism, actions the results of which have been translated into figures by pathological chemistry, with its precision of method and infallible tests.

These conquests, these discoveries, these hopes, all this following so closely the soaring flights of the sciences which are striving to constitute a therapeusis truly etiological and pathogenetic, are so many proofs of the certainties which to-morrow holds in reserve for us, and must urge us on to labour and find them. But, close and dazzling though the hour of revelation may be, shall we, anxious practitioners of medicine, wait to act until it strikes? The paths we have traversed are sown with the fragments of exploded theories, the data which past experience seemed to prove most sure are shattered, and the new way is hardly even mapped out. Yesterday a milk diet was the basis of the treatment of Bright's disease, of ulcer of the stomach, and of many forms of dyspepsia; saturation with iodide of potassium and mercury was an axiom in tertiary syphilis; it was a dogma that solid food should not be given in typhoid until the fever had abated; antipyresis was ranked a necessity; counter-irritation, emetics, and sometimes bleeding were customary remedies. To-day, all is changed: it is better to give meat to nephritic patients, and to submit them to dechloruration than to restrict them to milk; milk has disappeared from the diet of most dyspeptics; we feed typhoid patients at the height of the fever; tertiary syphilis is more amenable to iodides than to mercury; antipyresis is no longer thought essential; venesection is but a memory, and blistering is officially banned. Moreover, that chemistry which has created by a miraculous synthesis agents whose properties are determined by their molecular constitution, has inundated the Materia Medica with a flood of unlikely drugs, which on their first appearance gained the confidence of the physician, only to make him speedily indifferent to them all. Truly, in this therapeutic whirligig, when so many old indications waver, so many old medicaments disappear, and when the new spring is only showing its first buds, the sick man asks something more than the doubts of the moment, and it will be my duty to show you how we can relieve many of his ills, by relying on some of the rules of the experience of the past, fortified by the modern discoveries which are beginning to govern therapeutics.

These temporary rules I shall try to lay before you: To free one's self from the fetters of doctrine and theory; to abolish from one's consideration every generalisation with reference to the facts observed; to devote one's self singly to these facts considered in themselves; to learn how to define them and to separate them from their multiple pathological combinations. For this, to do as the chemist does when he is analysing the composition of a mixture of various bodies; to dissociate bit by bit the sum total of the etiological and pathological phenomena and organic reactions which constitutes the disease; to study separately each one of these phenomena, then to try to realise the order of their appearance, their relative importance, and their subordination to each other, in learning to distinguish those symptoms which represent the defensive reactions of the organism and those which depend on the onslaught of disease. To carry this analysis to a successful issue, it is necessary to jettison the cargo of nosological framework with which a venerable organic theory has laden us, in identifying the disease with the lesion. Already the antiquated joints are cracking under the blows which bacteriology and chemistry have dealt. Acute lobar pneumonia is now no more than a focal pneumococcal infection which has the power of becoming disseminated; erysipelas is one aspect of a streptococcal poisoning; *dysenteria nostras* becomes one of the forms of infection with *B. coli*; boils, carbuncles, and osteomyelitis are results of the invasion of staphylococci. Beside these new groups of micro-organismal diseases we must set functional affections of organs,—hereditary or acquired vice of the elementary tissue exchanges, which, becoming permanent, fashions first morphological modifications, then gross lesions. For this a new formula is coming into being: "A disturbance of function ends in an organic lesion."

The identification of the malady with the lesion which the organic theory inculcated, brought in its train an organic and anatomical line of treatment. This has had its day; it has wavered from its lack of success. If, in some cases, it succeeds, as in the treatment of syphilitic lesions by the iodides and mercury, yet no one can show an authentic cure of arterio-sclerosis by the same method, nor has atrophic cirrhosis of the liver ever been benefited by treatment directed against the newly formed connective tissue. But, on the contrary, if we try to act on the lesion by influencing the functions of the affected organ,—stimulating them when they are in partial abeyance, depressing them if they are over-active, correcting them if they are aberrant,—we open up a much more fertile land for therapeutic activity. And if we attack the disease in its functional period, before gross changes have occurred, what prospect shall we not have of hindering its progress should we succeed in re-ordering the functions which have become disturbed. Accordingly, immediately after the tried and proved drugs which tradition has bequeathed to us, the secret of whose efficacy modern science has deciphered,—mercury in syphilis, quinine in ague, salicylates in rheumatism, colchicum in gout, iron in chlorosis, iodides in asthma, etc.,—we must place, first, those which etiological and pathological therapeutics has tested, of which diphtheria antitoxin is a perfect illustration; second, the medication of functional disturbances and vices of primary nutrition, in trying to penetrate to their origins, that their cause may be removed, if removable it be.

Look now at another aspect of the problem: the manner in which medication influences the disease. Except as regards curative immunisation, which is now strong enough to do without the prop of theory, we still seem, in spite of ourselves, to be in a dilemma between the two doctrines which have puzzled therapeutics since the dark ages of medicine. Should we, with Hippocrates, assist nature to cure itself, or should we, with Galen, use all our armamentarium to quell the disease? I have no ambition to reconcile the two doctrines any more than to contrast and decide between them. Both contain an element of truth. It is beyond doubt that one day the progress of pathology will show to therapeutics the maladies which ought to be attacked directly, and those in which no more is needed than to aid nature's efforts. But there are plenty of cases, even in addition to acute diseases, where we shall remain for long, if not always, slaves to the *vis medicatrix*, and to the life which sustains it, with all the vigour of its nutritive and nervous energy. Hear the masterly words of Baglivi, who was a great practitioner despite his Baconian temper: "The physician is but the servant of nature; if he do not decide to obey her at first, he will never learn how to command her." Disease does not consist of chemical, bacteriological, mechanical, or physical alterations in the organs and tissues: therapeutics does not consist in opposing these counteracting forces; medicaments do not act by reason of their antagonistic properties, but in virtue of guiding the footsteps of the *vis medicatrix*, the "consent" of which (as Pidoux says) is indispensable. The wise men of old have told us "a medicine which nature turns from will profit nothing." Here are eternal principles which will withstand all upheavals. Modern discoveries are materialising all this metaphysical philosophy. They let us see more deeply every day into its arcana. Armand Gautier has shown us how this "healing power" annihilates microbes and autochthonous toxins. We know the sudden turns of the mechanical defence by the phagocytes, and the chemical defence by the catalases of the leucocytes and tissues. Oxidations, reductions, chemical synthesis, phagocytosis, chemiotaxis, bactericidal power, morphological changes of the cells, eliminative efforts, are so many manifestations of the *vis medicatrix*—manifestations which medicine has discovered, and which therapeutics can often favour or even initiate.

Under circumstances in which we are powerless to aid nature's attempts at cure, from ignorance of her principles and methods, we call to our aid functional therapeutics, which also proceeds on the lines laid down above, inasmuch as its aim is to affect the dynamics rather than the structure of the cell, but deviates from them inasmuch as, being compelled to disregard a natural defence which is in abeyance, it bears direct and independent succour to the organism. On this, facts speak more clearly than any homily. Let us consider the recent evolution of the treatment of cardiac disease. Modern treatment directed against a systole is scarcely exposed to criticism. According to the indication, we restore the contractile power of the heart when it is not exhausted by degeneration, and we lighten the work of the organ by diminishing venous stasis. The majority employ digitalis and a milk diet; others prefer to conjoin with these some diuretic which they know how to handle; some make a selection of the newer cardiac tonics, and combine or alternate them with the foregoing. The indications are definite, it is known how they can be met, no more is required on the part of the doctor but tact and experience.

But a systole is only the complication of an antecedent malady; how shall this be met? When we have descanted on a blowing murmur, its mechanism, its properties; measured the size of the heart, estimated its contractibility; examined the state of the arteries and the peripheral circulation; and when, after the general hygienic and dietetic instructions (on which there is by no means perfect concord) have been given, we arrive at the writing of the prescription, tradition serving as our torch, we order digitalis for mitral and tricuspid cases, iodide in aortic disease, strophanthus, caffeine, and iodide of soda should the myocardium be affected, theobromine and dechloruration if there be œdema, varying the details according to the susceptibility of the patient and the peculiarity of the symptoms.

Then Henri Huchard makes his brilliant discovery of the arterial cardiopathies, and recognises the part which increased tension plays in the production of arterio-sclerosis. Then he shows the importance of variations in that tension in cardiac disease, and the place of dyspnœa due to intestinal auto-intoxication. A revolution has been accomplished. New indications are unmasked. We seek the causes of hypertension and hypotension; we note their fluctuation in cardiac and arterial diseases; we study the way in which diet and drugs transpose them, and at last the sad history of circulatory diseases approaches the time long dreamt of, when we can better assuage suffering, prolong life, and, by healing the functional disturbance which precedes the thickening of the arteries, arrest the malady at a stage in which it is still curable. It is bare justice to recognise Huchard as the leader of this evolution in therapeutics.

We next turn to the treatment of nutritive diseases; of these I may speak briefly, since they will form one of the subjects of my lectures this year. In the majority of these maladies the curative effort of nature is diminished, and its direction and activity are ill known. Chronic rheumatism, diabetes, gout itself, have little tendency to spontaneous healing: the Hippocratic aphorism cedes place to that of Galen. These affections owe their existence to causes which elude our knowledge, or are incapable of being suppressed. The treatment which we mete out to them would merit the epithet of pathogenetic could we specify the successive mechanisms which, commencing with the etiology, create and carry on the disease. But most of these remain hidden from us, and we do not penetrate their mysteries very deeply when we assert that chronic rheumatism is a nutritive dystrophy, and that gout is due to excessive production or undue retention of uric acid, the residue of nuclear disassimilation. In the one case darkness is not lightened by the Greek appellation; in the other, we only detect mere fragments of pathogenesis. Nevertheless, as the chemical analysis of the excreta, the examination of the blood and of the respiratory interchanges, widen the bounds of semeiology, and unearth the hidden disorder which the ordinary symptoms only bring confusedly to the surface, we are able to widen our symptomatic treatment, to make it more delicate and searching, and even to decorate it with the title of physiological therapeutics.

Thus, in ordering for the sufferer from renal lithiasis a diet which diminishes the quantity of exogenous purin bodies, in combining the original sources of uric acid with substances which render them soluble, in ensuring the excretion of uric acid in the guise of its soluble salts, we try to tear asunder some of the links which bind the symptom, gravel, to the unknown diathesis which produces it; we fruitfully treat some of the morbid elements which engender lithiasis, although as yet we can only deal with some chemical changes, and there still remain profound vital reactions, the essence of which we must seize upon before we can establish a truly pathological therapeutics.

From this hasty review, it emerges that no system of therapeutics untouched by absolutism is in the position, at the present moment, of being a sure guide to our steps through the mazes of the treatment of the sick. We are in a period of transition, and without plunging into the subtleties of an eclecticism which rests only on perceptions, and accentuates their defects at the expense of their qualities, my strict duty is to keep you within the narrow vantage ground which encloses proven facts, and to show you the implications of these.

The facts are these: There are traditional, undisputed remedies which have stood the test of time, and have constantly been perfected either by skilled manipulation or by the discovery of their modes of action. These lie at the foundations of therapeutics. Beside them we place certain etiological and pathogenetic medicaments the value of which has been homologated by universal approbation: these will be traditional to-morrow.

Next come functional remedies, the number of which increases little by little as physiology advances; these are directed as well against the gross lesions as against the causal functional disorder. Finally, the medication of nutritional vices, an important section of functional remedies, for it strikes at the chemical deviations of morbid life. It aims at the less obvious symptoms which the pathological chemist marks for us, while ordinary symptomatic remedies, which complete our picture, reply to the manifest evidences of disease. So much for drugs.

Therapeutic tactics is the art of manipulating these. It defines their indications, discerns their range and the place they occupy, comes to the aid of nature in acute and many chronic diseases, or attacks the malady directly when the organism cannot defend itself. We select from among the medications all that is certain from the indications, all that is accessible to our methods of exploration, and this without a preconceived system, without a premature synthesis, but alert to catch a glimpse through any loophole of the faintest ray of light, yet guarding against seeing the mirage as a reality. Such is my programme. Lowly, even backward, it may seem to you, but I have no other to offer to men who are destined for practice, for if it does not inspire enthusiasm in your minds it will at least show you how to avoid much disillusionment. Assuredly it has nothing to do with high-flown philosophic therapeutics, and the mental attitude which it requires calls into play no lofty flights of the imagination; with such the practitioner has little concern, and his priesthood, devoted to the service of humanity, is honourable enough to reconcile him to the loss.

This priesthood he exercises not only through his science and by the height of his moral education, but by the confidence which these inspire in the minds of those he labours amongst. He must know how to gain that trust, and how to retain it when the anguish of prolonged sickness makes courage wane and overcomes resignation. No one can specify the value which it adds to treatment, yet no one casts doubt on the fact that it aids all remedies, if indeed it be not in itself a species of healing power. The emotional and intellectual co-operation of the patient with his doctor is a condition of success, and he only can compel this who has faith in the measures he uses.

Gentlemen, though it may be that some, not without bitter regret, have imagined heaven so empty that suffering man has lost the old beliefs which lulled him to sleep, let us physicians gather to our heart the virtues which all the gods have left us as an heritage: the faith which acts; the sympathy which shows us how to console by making the grief of others our own; the hope which sustains.

When the evil seems to defy all our resources, and those of the very organism itself, ours is the lofty mission of raising the flaming torch of hope high above all the miseries amidst which life dies. This supreme consolation of hope we must do more than urge—we must practise it in ourselves, so that in the last sad extremity the man who has trusted his life to us shall have no right to cry, "You have not cured me, you have not relieved my pain, you have not comforted me."

In the last battle, fatal as you may foresee the issue to be, preserve this half-hidden hope unfailingly, do not give up fighting, and bring into line all that your conscience justifies, when science has spoken her last word. Energy and tenacity will procure you some victorious revenges. The Senate and the Roman people decreed triumphal honours to the soldiers who, conquered, had yet not despaired of victory.

THE TREATMENT OF SCOLIOSIS BY DR. KLAPP'S SYSTEM OF EXERCISES: A RÉSUMÉ.[1]

By Chad Woodward, M.B., *House Physician and Surgeon, The Deaconess Hospital, Edinburgh.*

A consideration of the anatomical mechanism of the spinal column convinces one of the prominent part played by the muscular and ligamentous elements in maintaining the normal attitude of the spine. The vertebræ without their muscular and ligamentous adnexa are like bricks piled loosely, the one upon the other, without mortar.

If from any cause the muscles and ligaments find themselves unequal to the demands made upon them, either from a loss of tone and relaxation or from a disproportionate increase in the weight of the upper part of the body, then the vertebral column yields; and since it yields most readily laterally, a condition of scoliosis is produced.

It will therefore be apparent that special attention, in the treatment of scoliosis, should be directed to the muscles and ligaments: to strengthen them in early cases, and so prevent deformity: in later cases, where deformity already exists, to stretch them, and so restore mobility to the spinal column. Mobility and strength are the great objects to be gained.

In all forms of scoliosis, whether they are due to debility, a too rapid growth, or rickets, the same goal is aimed at, *i.e.* a restoration to the normal—anatomical and physiological. In order to stretch the shortened ligaments and muscles, with a view to removing the deformity, various kinds of fixed apparatus have been devised; and to restore mobility, numbers of most ingenious machines have been constructed for the production of passive movements of the spine. No very brilliant results have, however, attended their use. Upon more rational lines, trapeze and other gymnastic exercises have been recommended, which certainly improve the patient's general health, and tend to restore lost muscular tone; but they do not go far enough—in short, they are not sufficiently "spinal." We are all familiar with the spinal contortionists of travelling shows, and the remarkable mobility possessed by their spinal columns. It was a consideration of such "snakemen" that led Dr. Rudolph Klapp, Oberarzt in the University Poliklinik of Bonn, to devise the exercises about to be described. He very pertinently asks, "Has a snakeman ever been produced by passive movements or fixed apparatus? Assuredly not. We must aim not only at a restoration of the normal function, but at the production of 'spinal specialists' or athletes; for it is only by a high degree of musculature and mobility that any existing deformity can be overcome, or prevented from occurring."

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[1] *München. med. Wchnschr.*

What active movements are the best to employ in order to obtain this end? There are no movements of the spinal column in ordinary use by man, walking as he does in the upright posture, that, for our purpose, are of any great value. It is quite otherwise with the movements of the spinal column when the gait of quadrupeds is under consideration. Horses, cows, and dogs may be taken as illustrations. If a puppy be observed when walking, it will be noticed that the spinal column, especially in the lumbar region, undergoes very marked deviation laterally, with every forward movement of a hind limb.

The footprints of a moving quadruped illustrate the lateral curvature that takes place, the concavity being towards the side where the fore and hind limbs are close together.

If we ourselves crawl on hands and knees and imitate the progression of quadrupeds, the vertebral column will be observed to become curved in a similar manner. One may perhaps here be allowed to call attention to the importance of really imitating quadrupeds; for most people, when crawling on all-fours, move hand and knee of one side simultaneously forwards, constituting the mode of progression known as pacing. We have ourselves observed in this city a hansom horse, which, when called upon to trot, invariably "paced." The movements of such an animal are not suitable ones to be imitated by a scoliotic patient.

It is the lumbar and lower dorsal regions of the spine which are chiefly influenced by four-footed progression; but we require something more than this in order to remove deformity and give our scoliotic patients thoroughly mobile spinal columns.

A still wider range of movement, calling into play not only the lumbar and lower dorsal regions, but also the upper dorsal and cervical, can be obtained by various modifications of the four-footed gait. If with every step forwards the head be inclined to the side where a fore and hind limb are approximated, *i.e.* to the concave side, an influence will be brought to bear on the cervical and upper dorsal regions which materially increases the degree of curvature of the spine. And further, this lateral curvature of the whole spinal column can be much exaggerated, at each step, by bringing the limbs of the convex side—the widely separated limbs—over to the concave side—the side where hand and knee are approximated.

In carrying out this movement, the leg of the convex side is made to cross over the other leg. The dorsum of the toes now rests on the ground instead of the knee as before. Crawling on all-fours and the modifications above described allow the greatest possible lateral movements of the spine to take place.

These exercises are to be preferred to others recommended for the treatment of scoliosis, on account of the high degree of lateral movement which they allow, and this they do by permitting both extremities of the laterally flexed spine to be approximated. All exercises which are carried out in the standing posture obviously have one extremity of the spine fixed, and cannot therefore permit so free a range of movement to take place. Another advantage they possess is, that while they are being carried out the weight of the upper part of the body is not being transmitted to the ground through the intervertebral discs and bodies of the vertebra. It is not only the spine that is affected by these exercises, as they have a marked influence upon the ribs and general conformation of the thorax. The ribs on the concave side, which are closely pressed together when the patient is standing, become separated to a very visible and measurable degree when the patient is crawling on all-fours. This develops the capacity of the thorax most beneficially.

Children who practise these exercises assiduously for some months acquire an immense spinal musculature, becoming, as Klapp says, spinal athletes instead of spinal weaklings.

The Bonn method.—It is necessary for the hands and knees to be protected while the exercises are being carried out. Suitable gloves may be worn upon the hands, and for the shins and knees a small padded leather trough, provided with straps and buckles, can be easily secured from a saddler. The shoes that are worn should have leather toe-caps to prevent them wearing out so quickly as would otherwise be the case. The clothing is reduced to a minimum; a pair of knickerbockers with belt, or football shorts, being all that is worn. This allows the movements of the child to be perfectly free, and lets the instructor easily see the effect produced on the spine, and whether the child is putting its whole heart into each movement. For the same, of course, applies here as in other exercises for strengthening the muscles, with dumbells, etc.—exercises carried out in a slovenly and careless manner are useless.

In the first instance the patient must be carefully taught the correct four-footed gait. Little difficulty is, as a rule, experienced in this with children, as they pick it up very quickly.

To begin with, simple crawling in a straight line is the order of the day, a quarter of an hour being devoted to it in the morning and a quarter of an hour in the afternoon. This goes on for fourteen days. Then the first modification is introduced, the head being inclined as far as possible to the concave side at each step. When this has been acquired, and the patient is crawling well, then the second modification may be proceeded with, the widely separated limbs of one side (the convex) being moved over to the side where the limbs are approximated—the concave side.

The three exercises are persevered in, the daily time allotted being increased gradually from half an hour up to two hours—one hour in the morning the other in the afternoon—until four or five weeks have been spent at them.

At this stage special exercises are ordered to meet individual cases. As an example, let us suppose that the case we have to deal with is one with a right-convex dorsal scoliosis. We should order such a patient to go through his gymnastics crawling round and round in a large circle, always keeping to the right; the object here being to open out the concavity, and stretch the shortened ligaments and muscles to an even greater extent than before.

To gauge the amount of undoing of deformity effected, measurements of the patient may be taken. The distance from the shoulder to the gluteal fold should be ascertained both in the standing and crawling positions, and these measurements compared with similar ones taken from time to time.

Massage is a useful adjunct to these exercises; but where a number of patients have to be treated, the hot air treatment may be employed, as it does not require so many attendants, is therefore cheaper and more easily applied. In fact, hot air baths are found to be more beneficial than even the best carried out massage. Before every lesson the back is exposed to the influence of hot air in a suitable hot air bath for a period of twenty minutes. Baths for six or eight persons, heated by a crown of gas jets, can be very simply and cheaply constructed. The temperature employed is one ranging between 80° and 100° C.; it causes a free perspiration, and induces a considerable hyperæmia of the tissues of the back, which acts beneficially upon the stiff joints and shortened ligaments.

The patients themselves much enjoy the hot air bath, and often say that it makes the back supple and the movements freer.

The exercises we have described will, if properly carried out, be found to be a distinct advance upon anything that has, up till now, been proposed for the treatment of scoliosis.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

Wolter und Emmerich, Die Entstehungsursachen der Gelsenkirchener Typhus-Epidemie von 1901. München.

This monograph forms the first volume of the works published in honour of the jubilee of the well-known teachings of Max von Pettenkofer on this subject.

The facts connected with this epidemic are of very considerable interest. Geheimrat R. Koch, on 21st October 1901, gave it as his opinion that it was well established that the epidemic had been occasioned by the introduction of typhoid evacuations from the Horst into the Eiberg stream, from here into the Ruhr river, and from there was pumped into the water supply. On the strength of this opinion, legal proceedings were commenced against the directors of the water works for causing the epidemic by the introduction of unfiltered Ruhr water. The defendants invoked the help of Professor Emmerich and Dr. F. Wolter of Hamburg, disciples of the well-known Pettenkofer.

This monograph contains the evidence which they brought forward at the trial.

The Court had therefore to decide whether the epidemic was due to a contamination of the water supply with typhoid organisms, and if so, the directors were responsible for occasioning it; or if, as the followers of Pettenkofer affirmed, the water contamination had nothing to do with it, the epidemic being due to special local conditions of the soil which existed at Gelsenkirchen. The verdict as regards the occasioning the epidemic was practically that of "Not proven." The accused were fined on account of adulteration of "food material."

The monograph is divided into two parts: Part 1, by Dr. Friedrich Wolter, on the general epidemiological facts connected with the epidemic. Part 2, by Professor Dr. Rudolf Emmerich, which includes the experimental part of the investigation.

Part 1 is again subdivided, and solution of the two following problems is sought:—(*a*) Whether, in the autumn of 1901, in the affected district, the local and seasonal conditions, which, according to the epidemiological teachings of von Pettenkofer, occasion an epidemic outbreak of typhoid fever in a region where typhoid is always endemic, were present? (*b*) Whether the epidemic could be occasioned through water infection from the evidence brought forward?

In Part 2 Professor Emmerich deals with—(1) The character of the soil of the affected area. (2) The occurrence of typhoid bacilli in the pure (virgin) and impure soil of the affected area. (3) The degree of the impurity of the soil in the affected district, and the cause of this. (4) The output and distribution of typhoid bacilli on the surface of the soil before the outbreak of the epidemic. (5) The transference of the typhoid bacilli from the surface of the soil to human food material by so-called "intermediate carriers." (6) The degree of moisture of the soil in the affected area. (7) The saturation of the soil by moisture—a protection against typhoid and cholera epidemics. (8) The influence of dryness and rains on the occurrence and extinction of the typhoid epidemic. (9) A summing-up of the general causes of the epidemic. (10) Favourable conditions for the spread of the epidemic by commerce and conditions of dwelling-houses. (11) The occurrence of typhoid bacilli in the Eiberg stream and Ruhr water. (12) The pump pipe (by which the water was taken from the Ruhr). (13) Could the typhoid bacilli multiply in the Ruhr water before and during the epidemic in 1901? (14) The chemical and bacteriological characters of the Eiberg stream water. (15) The Leyther filter bed and the break in the 12-inch pipe. (16) The establishment of the complaint, the refutation of the same, and further grounds against the causal rôle of the drinking water. (17) The use of unfiltered drinking water in periods of great dryness and the existence of typhoid epidemics is accidental and of no causal connection. (18) The extension of the drinking water epidemic into a "contact" epidemic in Gelsenkirchen. (19) The campaign against typhoid epidemics.

The authors may be congratulated on the painstaking and laborious investigations which are embodied in this work. The monograph is illustrated by maps and photographs. The map shows the distribution of the water supply and the typhoid areas at Gelsenkirchen. The photographs illustrate very well the defects in the sanitary conditions of the town.

The authors draw the conclusion that their observations and experiments support the views of Pettenkofer regarding the etiology of typhoid fever, namely, that certain conditions of soil are the essential factors in the spread of the disease. The trend of modern investigation, however, is against this theory or hypothesis, because it shows us that the extracorporeal life of pathogenic organisms is very limited. Koch maintains that the true host of the typhoid bacillus is the human tissues, and that it lives for a very short time in water, soil, etc. The very careful work of Frosch and von Drigalski in Trier show that it is possible to stamp out an epidemic of typhoid, provided that every case of infection is recognised and isolated. The recognition of all cases is difficult, as many show few symptoms of disease, and it is necessary to employ special methods to detect them. Some cases continue to excrete bacilli for long periods in the urine or fæces after complete recovery. Such cases as these, which ordinarily escape detection, continue to keep up the spread of the disease. In consequence of the success of the initial experiments of Frosch, the German Government have established eleven bacteriological institutes in Alsace Lorraine, where typhoid is endemic, with three or four trained workers in each, in order to combat the typhoid fever there. The results have been satisfactory, especially amongst the military population, where recognition and isolation can be more effectively carried out. This method of attacking the disease is the direct one, and the results obtained enabled the indirect measures, *i.e.* improving the general sanitary conditions, to be carried out with greater scientific accuracy. We see, therefore, that the results obtained by the anti-typhoid Commission in Alsace Lorraine are directly opposed to the teachings of Pettenkofer. The Commission have further shown that many cases returned as typhoid fever are not due to Eberth's bacillus, but to *Bacillus paratyphosus B*, a totally different organism. So that what is called a typhoid epidemic is in many cases really a paratyphoid infection. Amongst our troops in India, where, as is well known, typhoid fever is very prevalent, the prosecution of the line of attack carried on in Alsace Lorraine by isolation of all cases of typhoid and paratyphoid infections offers more chances of success than the more problematical ones based on the teachings of fifty years ago of the renowned Pettenkofer.

Clinical Applied Anatomy, or the Anatomy of Medicine and Surgery. By Charles R. Box and W. M'Adam Eccles. London: J. & A. Churchill.

This is an instructive book, which we should like to see in the hands of every student engaged in clinical work. It differs from other books with a similar title, inasmuch as it can hardly fail to attract and retain the interest of the reader, and it discourses as little on anatomy as a work professing to deal with this subject could possibly be expected to do. Its table of contents is marvellously like that of a text-book on surgery: beginning with inflammation, the chapters succeed one another with gangrene, burns and scalds, parasites, tumours, fractures, dislocations, and lesions of the various systems, concluding with diseases of the ear; the text, however, teaches medicine and surgery, anatomy and pathology, all harmoniously blended so as to present the clinical features of disease in a light at once interesting and instructive.

When it is understood that in the preparation of the volume the authors have endeavoured to follow, in some degree, the lines of Hilton's "Rest and Pain," it goes without saying that it is no cram book intended to prepare candidates for examination, but a scholarly work written with the highest of motives. As already indicated, we have formed a very high opinion of the work, and what we say in the way of criticism is not dictated by anything approaching the captious spirit.

The inequality of scope in the different chapters of the book is as remarkable as it is incomprehensible. The information given under certain heads is so meagre and elementary as to fail in accomplishing whatever object the authors had in view. The chapter on Tumours, for example, describes some varieties quite adequately, while others are slurred over or not mentioned at all (*e.g.*, Neuromata, Endotheliomata). Fractures and Dislocations receive a fair amount of attention, while Diseases of Bones are dismissed in less than three pages, one-half of which treats of spinal caries; Diseases of Joints are given their congé with four and one-half pages, in which limited space an attempt is made to describe the diseases of the individual articulations.

The chapter on the Muscles, Tendons, and Fasciæ, although short, is a useful one, the observations on the muscles selected for comment being eminently suggestive; but with so much to say in the limited space, why give one and one-half pages to Dupuytren's contraction of the palmar fascia?

It is in the chapters on the Nervous System that the authors first justify the title of the work, and give a really adequate and comprehensive description of the subject in hand, and this section of the book is admirably illustrated. In the surgery of the peripheral nerves, the time-honoured statements of older works reappear without any reference to the illuminating observations of Head, Sherren, and others. The diseases of the vascular, lymphatic, respiratory, alimentary, urinary, and genital systems are described and illustrated upon a standard little short of that attained in the nervous system.

The authors' style is attractive, and, with a few unimportant exceptions, eminently clear. The following paragraph (p. 396) might be remodelled with advantage:—"When a femoral protrusion has left the femoral canal, it most frequently tends to descend the front of the thigh rather than to ascend superficial to Poupart's ligament. The upward course is, indeed, probably by the attachment of the deep layer of the superficial fascia to the fascia lata being very firm." At the end of the first paragraph on page 165 the word "carotid" should be in the plural.

The Physiology and Therapeutics of the Harrogate Waters, Baths, and Climate. By William Bain, M.D., M.R.C.P., and Wilfrid Edgecombe, M.D., F.R.C.S. London: Longmans, Green, & Co.

Of the utility of this book there can be no question, and we welcome it for several reasons. In the first place, nothing is more vexatious to a patient (and the annoyance recoils on the head of his medical adviser) than to be sent to a spa which is unsuited to his complaint, or at a wrong season of the year. In the second place, we have here evidence that our home waters may be as efficacious in the treatment of disease as those of the foreigner, and that local authorities are becoming alive to this, and developing their natural resources by the most modern equipment for balneo-therapeutics. In the first section of Drs. Bain and Edgecombe's book we have a general account of the pharmacology of the Harrogate waters so far as it has been worked out. There is a short but clear introductory account of the theory of ions, which has shed so much light of late years on the physiological action of salts. The springs of Harrogate number no less than seventeen, and fall into two classes—the saline-sulphur and saline-chalybeate. The old sulphur water, the most powerful and generally useful of these, has been studied most fully by the authors, both by personal experimentation, and by observations on animals, and numerous tables and charts illustrating its effects are given. After the description of each spring there is a short résumé of its therapeutic use. The second section deals with the baths, which include not only those indigenous to the locality, but various imported baths—brine, peat, etc., special methods—the Aix and Vichy douche, for example, and all the different forms of heat, light, and electric baths. The action of the baths and their uses are next considered, and here, as elsewhere throughout the book, the writers seem to us to take a moderate and judicious view of the value of spa treatment—neither exalting it as a panacea, nor yet depreciating its effects because many of these have been learned empirically and are not susceptible of scientific explanation. The third section deals with the climate, etc., of the town, and though this is necessarily rather reminiscent of the guide-book, its exclusion would have lessened the practical usefulness of the book. Finally, we have a general account of the treatment of chronic disease at Harrogate. From a table given it seems that more than 60 per cent. of the patients sent suffer from gout, rheumatism, skin diseases, neurasthenia, or hepatic or gastric disorder. Only general indications for the employment of the waters are given, and this is obviously but reasonable, for no one but a physician actually practising at the watering-place can satisfactorily advise individual patients. Nevertheless the chapters on general therapeutics will prove a useful guide, and will prevent unsuitable cases being sent to Harrogate. We think that the authors have produced a very serviceable book, and one which will enhance the repute of the Harrogate waters. If other British spas were similarly dealt with, the efflux of Britons to foreign "Bads" might be prevented, and even, some day, the Teuton come to England for his "Kur."

Physiology of the Nervous System. By J. P. MORAT, of the University of Lyons. Translated and edited by H. W. SYERS, M.A., M.D. (Cantab.). London: Archibald Constable & Co. Ltd.

THE book is a translation of the portion of the "Treatise on Physiology" by Professors Morat and Doyon which is devoted to the functions of innervation. It is a large work, and well illustrated by diagrams in the text. Anatomical description is not indulged in except where essential for the explanation of the functions of different parts; much of it is indicated by diagrams. The physiology of the whole of the central and peripheral parts of the nervous system is gone into, so that the scope of the work is a large one. In each subject the views of different authorities are considered and discussed, references to literature are numerous, and the author has often decided views of his own.

The first part deals with the peripheral nerves, and the physiology of the "nervous element" or neurone. It contains material which is unusual in British text-books, but some subjects are less fully treated. The theoretical side is strong throughout; much of it is highly speculative in the light of our present knowledge, but all the more interesting and suggestive on that account. Individual nerves, spinal and cranial, are considered, and their functions described.

Reflex action is next taken up, gradually passing from the lower to the higher and more complex reflexes. The functions of the various tracts and centres of the spinal cord are discussed, and the sympathetic system has a special section devoted to it.

The different parts of the brain are considered in detail, and the last part in the book describes the functions of the special senses.

The description is clear and well arranged, and has not suffered in the translation. Some of the terms strike one as being clumsy, such as "primary systematisations," which is the heading of a chapter, including reflex action, excitation, and inhibition, and a classification of nerves; but the author's meaning is quite clear when the text is read. An immense amount of material is collected and presented in an interesting manner without any appearance of being cramped. The physiology of the nervous system is making such rapid strides that it is difficult to keep any description of it up to date, and the book suffers in this respect, but not more so than others of its kind. It is a very useful work and well worth study.

A Contribution to the Pathology of the Endometrium. By JESSIE M. MACGREGOR, M.D. Edinburgh and London: William Green & Sons.

IN this monograph Dr. Jessie MacGregor has supplied a most interesting and valuable contribution to the subject of endometritis. In spite of the large amount of work already done, there are still marked differences of opinion as to nomenclature, classification, and the interpretation of appearances as seen under the microscope. This literature exists widely scattered, and it is time that there was a summing-up of our knowledge. This Dr. MacGregor has undertaken, not only reviewing but reworking the subject, a labour that has involved the examination of two hundred and fifty specimens. The whole subject of the endometrium, both on its physiological and pathological side, is here considered in detail, and what adds so immensely to the interest and value of the book is the comprehensive series of micro-photographs (numbering 106). By their means we are enabled easily to follow the author in her descriptions, and to appreciate the classification that she bases thereon. Several points of interest stand out in the course of a perusal of this book. The first is the difficulty that we have in saying what is the limit of physiological changes in the endometrium. The constant variations that it undergoes in association with menstruation, pregnancy, the climacteric, and senility are scarcely yet appreciated as they should be. Some of the photographs illustrating them are well worthy of study. The task of finding some term which shall cover all cases seems to increase in difficulty rather than to diminish as our knowledge of the changes in the endometrium advances. Dr. MacGregor would prefer to employ the term "uterine catarrh" for clinical purposes, as being less ambiguous than endometritis. It certainly presents some advantages, but we should have thought that these lay in its greater ambiguity. From the pathological point of view Dr. MacGregor suggests a classification, which, so far as her interpretation of the microscopical appearances is concerned, seems to be a sound one. Whether the line between the so-called congestive œdema and the adenomatous variety is as clearly defined as she would seem to indicate, we have some doubts.

Most useful from a practical point of view is the section on transitional types, and the difficulties that may be met with in distinguishing between malignant and non-malignant forms. A further point worth noting is the impossibility at the present time of correlating the various changes in the endometrium with the clinical symptoms. It is undoubtedly in this direction that further information is required.

This is a most careful and thoughtful work, and we think there are few who could read it through without gaining a clearer conception of this difficult subject. The illustrations alone make it a valuable work of reference, this being the only attempt that we know of to supply such a comprehensive series.

We recommend this monograph without hesitation to all those who would know something of the very varied conditions that are included under the heading of endometritis.

Notable Scottish Trials: "Dr. Pritchard." By William Roughead, W.S. Glasgow: William Hodge & Co.

The second of the Series of Notable Scottish Trials is as full of interest as the volume dealing with the trial of Madeleine Smith.

The author must be congratulated on producing a book, not only of popular interest, but also of considerable scientific value to the student of forensic medicine. The history of this remarkable case has been compiled with an amount of care and completeness which reflects the greatest credit upon the writer, and, with the exception of a few printer's errors, we have found nothing to which exception can be taken. Many important facts relating to the trial and circumstances connected with it are published for the first time, so far as we are aware, in the present volume. It is thus bound, on account of its completeness, to take the place of all previous publications on the subject.

The scientific evidence is naturally that which will appeal most to the medical man or chemist. Two points in connection with this evidence may be referred to as of special importance and interest. The first is the fact that Sir Douglas Maclagan, who appeared for the Crown, did not discover the presence of mercury in his chemical analysis of the organs of Mrs. Taylor, Pritchard's mother-in-law, until his attention was specially directed to it by Dr. Penney of Glasgow. This was an error not difficult to account for, but at the same time the fact conveys a warning, namely, that in such cases nothing should be left to chance; and just as it is a rule in performing a medico-legal post-mortem examination to examine every cavity and organ of the body, no matter how apparent the cause of death may seem, so in the chemical analysis we must not be turned aside by the discovery of one deadly poison from searching for the possible presence of yet another.

A circumstance not generally known, we believe, is that Dr. Penney made the same mistake, and that the credit of being the first to detect the presence of mercury was really due to Dr. Penney's assistant, who is now himself a well-known analyst.

The second point to which we would allude is the evidence given by Dr. Paterson at the trial, which teaches a valuable lesson to medical witnesses for all time coming. His evidence earned the severe strictures of counsel for the prisoner, and the grave censure of the judge in his charge to the jury. It would take up too much space to go into this aspect of the trial, and we can only recommend those interested to read the evidence for themselves, and the defence of his conduct published by Dr. Paterson after the trial, which is included in the appendix to this most fascinating history of a remarkable crime.

NOTES ON BOOKS.

This volume—*Dissecting Manual, based on Cunningham's Anatomy*, by Wm. H. Rockwell, Junr., M.D. (W. Wood & Son, New York)—is described as a dissecting manual, intended for dissecting-room use, but it is entirely different from other books designed for this purpose. No instructions are given regarding dissection, and there are no descriptions of regions. One fails to find any account, for example, of the axillary space. What the volume does contain is a brief synopsis of each of the principal individual structures of the body, taken up more or less in a regional order, and extracted from the text-book edited by Cunningham, the reference to the pages in that volume being given at the end of each paragraph. One cannot imagine a dissector working from this book, and it is difficult to see what its use can be.

This book—*Surgical Diseases of the Dog and Cat*, by F. T. G. Hobday, 2nd edition (Baillière, Tindall, & Cox, London, 1906)—is written in a systematic manner, and is much larger than the first edition. It is much more perfectly illustrated, and thus enables the novice to recognise any diseased condition of the animal much more easily than can be done by any amount of long-drawn-out verbal descriptions. No modern veterinary surgeon, master of foxhounds, dog or cat breeder ought to be without this book, for with it he cannot fail to diagnose the diseases of the animals under his charge, and properly treat them. The most valuable features of the volume are the description of the various up-to-date methods for holding the dog for examinational purposes, the best methods of giving an anæsthetic, the various instruments required for performing operations on the animal, and the proper way to apply antiseptic treatment. The author says that the deeply rooted idea that the dog's tongue is beneficial to a wound may now be relegated to a past age, and if antiseptic treatment is properly carried out, an animal will not lick its wounds. He gives an illustration of an Elizabethan collar, the application of which to a dog makes it absolutely impossible for him to lick his wounds on any part of his body behind the collar, the value of which cannot be overestimated. He also gives some very good plates, which show the various attitudes animals assume when they have either dislocated or fractured their legs; there are also skiagrams showing the positions which the bones have assumed after fracture and dislocations; in fact, Professor Hobday has shown that all the modern methods of surgery can be applied in treating the dog and cat as well as man.

We have read with much pleasure the latest volume of international clinics (*International Clinics*, 1906, vol. iv., London, J. B. Lippincott Co.). A wide variety of topics is presented. It would be impossible to single out any of the papers as of outstanding excellence, as the general standard is high, and we cite the following rather with the view of indicating the scope of the volume. The first paper by Gottheil deals with the treatment of psoriasis, and, contrary to Edinburgh teaching, the use of arsenic administered hypodermically up to the point of tolerance for a long period is recommended as an essential measure. Sir Dyce Duckworth deals with the later stages of cirrhosis of the liver, and Thayer recommends a new method of abdominal palpation, in which the observer takes up a position behind the patient, who sits up with his legs apart and his hands on his knees.

The results of various abdominal operations and post-operative neuræsthesia are included among seven surgical papers. Ectopic pregnancy is the main theme in the gynæcological section. Warthin gives a careful account of the effects of Röntgen rays on the blood-forming organs, and is not sanguine regarding the X-ray treatment of leukæmia. Simon gives an elaborate compilation of the history and significance of eosinophilia, and has contrived to make it singularly interesting.

This report (*Twenty-eighth Annual Report of the State Board of Health of New Jersey.* New Jersey: New Printing Co., Paterson) for the year 1904, recently published, as usual contains much information, valuable both from a statistical and from an administrative point of view. A circular by the Board, issued in 1904, giving general instructions for preventing the spread of diphtheria, scarlet fever, typhoid, and smallpox, is given in full, and contains much that is excellent, and suggests some measures which might with advantage be adopted on this side of the Atlantic, especially as regards the cleansing of school buildings during the prevalence of infectious disease. Under this heading, among other measures there is advocated that "each day during the prevalence of infectious disease, after the school is dismissed, all parts of doors, casings, and other woodwork of the infected apartment which can be touched by the hands of the children, including seats and desks, should be scrubbed with warm water, soap, and a stiff scrubbing-brush." It is also further stated that the floor should be in good repair, and without open cracks or crevices, and should be sprinkled with *clean water* daily before being swept.

The small work before us embodies the views of Mr. Reginald Harrison on *The Urethrotomies and Kidney Capsulotomy* in diseases and injuries of the urinary organs (John Bale, Sons, & Danielsson Ltd., London), as expressed by him in a course of clinics recently held at the London Medical Graduates' College and Polyclinic. Mr. Harrison has a higher opinion of the value of internal urethrotomy than many surgeons at the present day, but the figures he quotes from St. Peter's Hospital seem to justify it. He concludes that the normal calibre of the urethra may be completely and permanently restored, and that the absence of recurrence does not necessarily depend on the use of a bougie after operation. He has little that is new to say regarding external urethrotomy, indeed Syme left little to be said, yet curiously enough Syme's work is entirely overlooked in the chapters on this operation. We are glad to note, however, that Mr. Annandale's work on the combined operation of internal and external urethrotomy is frankly acknowledged. The short section on urethrotomy for ruptured urethra is well worth reading. The urethral route for the removal of stone from the bladder and for excision of the prostate finds an advocate in Mr. Harrison. The idea of incising the capsule of the kidney for the relief of renal tension in certain cases of Bright's disease we certainly owe to Mr. Harrison, and we incline to the belief that he has the best of the argument with Dr. Edebohls regarding the relative merits of simple incision and decortication of the kidney for this purpose.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF
J. S. FOWLER, M.D., F.R.C.P.Ed.,
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Diseases of the Respiratory System.

Infections of the lung simulating tuberculosis.—Two cases of *pulmonary streptothricosis* are reported by Ashton and Norris (*Jour. Am. Med. Assoc.*, 1905, September 9). The clinical picture is one of pulmonary tuberculosis, bronchiectasis and hæmorrhages being common. Streptothrix stands in a class intermediate between moulds and bacteria; it is not readily detected by the carbol-fuchsin method, and hence is liable to be overlooked unless the sputum is stained by Weigert-Gram. Streptothricosis of the lungs occurs in two forms—(1) The acute variety, giving rise to symptoms of broncho-pneumonia, with muco-purulent expectoration, at times hæmorrhagic, and containing necrosed lung tissue. Purulent metastases in the brain and skin, and less commonly in other organs, are apt to be met with in the later stages. (2) The chronic variety, which presents a picture almost identical with chronic pulmonary tuberculosis. The naked-eye morbid appearances in both forms are not unlike tubercle, but the branching threads of streptothrix replace the tubercle bacilli. From a tabular summary of twenty-six cases the following facts are gleaned: Males are most frequently affected, and the disease is one mainly of middle life. The duration varies from a week to several years. Twenty of the patients died, two improved, and two remained stationary. A pure streptothrix infection occurred in half; in the rest other organisms were coincidently encountered. The treatment is unsatisfactory. Cases of apparent phthisis, in which there is extensive tissue involvement and copious expectoration, but no tubercle bacilli, should be examined for streptothrix.

Eisendrath and Ormsby (*ibid.*, 1905, October 14) report a case of *systemic blastomycosis* with blastomycetes—a yeast fungus—in the sputum. Though blastomycetic dermatitis is a recognised entity, systemic infection is very rare, only four cases being on record. The visceral lesions found in this condition closely resemble tubercle. The patient in question had numerous cutaneous erosions, ulcers, and sinuses, in the pus of which blastomycetes were found. Physical signs of consolidation of the right apex were present, with blood-stained muco-purulent expectoration which contained the organism. The patient improved greatly under iodide. Of the four previous cases of systemic blastomycosis one had cutaneous, visceral, and bony lesions; the second was a case of cutaneous infection, which developed general symptoms resembling those of tuberculosis, its true nature only being recognised after post-mortem examination; the third case began with chest symptoms, very like those of acute phthisis, followed by cutaneous nodules and ulcers; in the fourth case, also, the initial infection was in the lung. The diagnosis of blastomycosis depends on recognising the budding yeast fungus by suitable tinctorial and cultural methods, tuberculosis being excluded by the absence of the bacilli and a negative tuberculous reaction. The disease improves greatly under, but is not, as a rule, cured by full doses of iodide.

The percussion outline of pleural effusions has recently been discussed by Kronig (*Berl. klin. Wchnschr.*, 1906, March 26), Rosenbach (*ibid.*, April 9), and Hamburger (*Wien. klin. Wchnschr.*, 1906, April 5). The first two papers deal with the curve of the upper limit of the effusion, and reiterate the fact that there is a triangular area of clear or tympanitic resonance, with its base upwards, close to the vertebral column on the affected side—in other words, the highest point in the dulness of an effusion is not close to the vertebral column, but lateral, either on or external to the scapular line. Kronig regards this as very constant; Rosenbach's opinion is that the conditions governing the level of an effusion are variable, and that though the paravertebral clearness is common it is not constant. The explanation given is that the resonance is due to the retraction or compression of the lung towards its most fixed point, the root. Hamburger's paper contains some fresh observations on this subject, which are not without interest. He is concerned exclusively with effusions in children. He finds that on moderately strong percussion there is a paravertebral zone of impairment on the sound side and a paravertebral zone of tympanitic resonance on the side of the effusion. The former sign has previously been noticed, and has been ascribed to displacement of the mediastinum by the pleural fluid. Hamburger's explanation seems to throw light on both phenomena, and to be in consonance with the physical conditions in the child's thorax. A percussion stroke sets distant parts in vibration, hence, on percussing near the vertebral column on the sound side, the vibrations are damped down and the note impaired by the fluid opposite, while, conversely, on percussing the dull side near the vertebral column the adjacent opposite lung is thrown into vibration, and imparts a resonant quality to the note. If the sound side of the thorax be firmly held by an assistant so as to check its vibration, the paravertebral clear zone on the affected side becomes much less evident.

Knee-jerk in pneumonia.—Barnes (*Birmingham Med. Journ.*, 1906, April) finds that the jerks are diminished or abolished in all cases of pneumococcal pneumonia, unaffected in septic pneumonia, and preternaturally active in tuberculosis. In acute pneumonia they as a rule disappear about the third or fourth day, reappear about the ninth or tenth, and for a day or two after their return remain slightly exaggerated. The persistence of the jerks in an obscure case cast doubt on the diagnosis of pneumococcal pneumonia, and eventually it was proved to be tuberculous. If the knee-jerks persist until the seventh day, the patient will almost certainly recover; conversely, their early abolition is unfavourable.

Ochronosis.

Few, probably, had ever heard of the curious pigmentary anomaly named *Ochronosis* until the appearance of Pope's communication in the *Lancet*, London, 1906, January 6. Since then Pick has discussed the subject very fully in a series of papers (*Berl. klin. Wchnschr.*, 1906, April 16, 23, 30, and May 7). Ochronosis was first described by Virchow in 1866, and since then about a dozen cases have been recorded—a proof of the rarity of the condition. Virchow described his original case as a pigmentation of all the cartilages of the body, which had the appearance of having been dipped in ink; the same pigmentation occurred, though to a less degree, in the denser connective tissue structures—tendons, ligaments, periosteum, and inner coats of the arteries. Subsequent observers have noted the same discoloration in the cardiac valves, loose cartilages of joints, kidneys, fascia, dura mater, lymph glands, and prostatic concretions. Melanuria and pigmentation of the ears have also been present in some cases. The discoloration varies from yellow, brown, or smoky to inky or ebony black; it is most intense in the immediate neighbourhood of vascular tissues, but is absent wherever ossification or calcification has taken place. The pigmentation is usually general, sometimes in splashes; microscopically there is both diffuse and granular pigment, the former chiefly in the ground substance, the latter in the cells. The small joints are often, and serous synovial fluids always, free from colour. Ochronosis (which is not in itself a fatal disease) affects persons at and above middle life. In Pick's patient, an old woman suffering from senile marasmus, chronic ulcer of the leg, and gout, the diagnosis was made during life from the almost grotesque aspect she presented. Her face was of a coffee-brown hue, with deeper brown spots round the eyes; the ears were an iridescent, steel-blue colour, and the hands dull steel-blue. The discoloration of the ears had begun sixteen years and that of the hands and face four years previously. The following appearances were observed post-mortem: Pigmentation of the skin of the face but not of the scalp or buccal mucosa; discoloration of the hands, particularly the palmar surfaces, the nails and dorsal aspects of the fingers being spared. The rest of the body was of normal colour. The dura was stained with yellowish-brown splashes. There was black stippling of the cardiac valves, anthracosis of the lungs, and pigmentation of all the cartilaginous structures. The capsule of the spleen had a black speckled appearance; the kidney showed yellowish-brown discoloration of the surface and pyramids, and there was black concretions in the pelvis of the organ. There was similar tinging of the serous coat of the intestine and the intima of the arteries. The suprarenals and glandular system generally were normal, and apart from the deposits of pigment there were only senile changes,—cardio-vascular lesions, etc.,—but nothing which could specially be connected with the ochronosis. Microscopically there was diffuse, unequal pigmentation of the hyaline ground substance of the cartilages, the cells being spared. Elastic and fibro-cartilage, the intima of the vessels, and the scleral connective tissue showed the same change. The liver cells and the heart muscle contained fine iron-free pigmentary granules. The muscle fibres of the duodenum were diffusely discoloured, as also was the kidney substance, which, in addition, showed interstitial changes. The epithelium of the tubules contained granules, and the tubules themselves yellow casts and masses of pigment. The connective tissue of the true skin (palm of hand) was a deep brown colour; the epithelium was free. In none of the pigment was iron detected.

The case, then, was typical of ochronosis. As in Virchow's observation, the pigmentation is almost entirely a diffuse process, but the unusual feature is its wide diffusion, such discoloration of the face having been described only by Pope. A peculiarity of the ochronotic pigment is that it gives a bluish-grey tint to the surface of organs, while the same tissues on section are yellowish-brown. This is, Pick shows, an optical "interference phenomenon." The chemistry of the colouring matter is unsettled. In Virchow's case it is said to have contained iron in small amount, and was regarded as a hæmatin derivative; others have failed to detect iron. Spectroscopically it is indifferent, and has, accordingly, been looked on as allied to melanin, which in all important respects it closely resembles. Pick next discusses its origin. Virchow believed it was derived from the blood, and was merely an excessive degree of normal senile pigmentation, while various other more or less problematical explanations have been given by other writers. It has, for instance, been suggested that ochronosis is the same as alkaptonuria, and is due to the pigment being deposited in the tissues as well as excreted by the urine. Definite proof of the association of the two conditions is, however, lacking. Pick offers the following theory of the pathology.

Melanotic pigments in general are derived from tyrosin by the action of a ferment, tyrosinase, and this ferment can transform other substances of the aromatic series to melanin. Now both Pick's and Pope's patients had been accustomed for many years to dress their ulcers with relatively strong carbolic lotion, and thus may have perpetually absorbed into the body small quantities of phenol,—a hydroxyl aromatic body,—which is capable of being converted into melanin by tyrosinase. On this view ochronosis represents the mildest form of chronic carbolic acid poisoning. In alkaptonuric patients analogous hydroxyl aromatic substances, resulting from abnormal proteid metabolism, circulate in the blood; if tyrosinase also be present, ochronosis plus alkaptonuria result, or, from individual peculiarity, the same constitutional anomaly may produce ochronosis alone. It will thus be of importance to seek for tyrosinase in future cases of ochronosis. The pigment, however it arises, seems to reach the tissues by a simple process of diffusion. Briefly, Pick's conclusions are—(1) Ochronosis is a special form of melanotic pigmentation. The colouring matter circulating in the blood is chiefly taken up by the cartilages and connective tissues without their being weakened thereby. (2) Melanin arises from the action of tyrosinase on the aromatic group of the albumin molecule (endogenous form); chronic absorption of carbonic acid may cause (exogenous) ochronosis. Ochronosis may accompany alkaptonuria if tyrosinase be present. (3) The pigmentation of the skin is pathognomonic. Melanuria may occur, in which case the urine becomes darker on exposure to the air. The kidneys may participate in the pigmentation, and excrete granules and pigmented casts.

Langstein (*ibid.*, 1906, May 7) in a short note on the chemistry of ochronosis demonstrates that in neither Pick's nor Hansemann's case was alkaptonuria present; he speaks very guardedly of Pick's theory. Garrod (*Lancet*, London, 1906, January 6) in a note appended to Pope's paper (which contains an excellent coloured plate of ochronosis) concludes that, while some of the instances of melanuria in ochronosis were not alkaptonuria, alkaptonuric subjects tend in later life to develop the condition under consideration—in other words, alkaptonuria is *a* cause, but not the *only* cause, of ochronosis.

SURGERY.

UNDER THE CHARGE OF

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Tuberculosis of the Vermiform Appendix.

In the paper before us, Hérisson of Paris (*Gaz. d. hôp.*, Paris, 1906, April 14) reviews the subject of tuberculous appendicitis, confining his study to the condition as it occurs primarily in the appendix, and excluding those cases in which the appendix is involved in a general ileo-cæcal tuberculosis. In this limited sense he does not find that the condition is common. In 500 autopsies of tuberculous subjects, Letulle found the appendix infected with tubercle in 8·3 per cent., but in the vast majority there were many other tuberculous lesions present. Taking all subjects, tuberculous and non-tuberculous, Hérisson estimates from available statistics that not more than 1 or 2 per cent. of cases of appendicitis are tuberculous.

It is extremely seldom that the appendix is the one and only seat of tubercle; but Cathelin has recorded a case, very fully investigated, in which no other focus could be found in the body. Tuberculous appendicitis has been met with more frequently in men than in women, and usually during adult life (20 to 40). It occurs, however, at all ages. Apart from the factors of sex and age, little else that is definite is known regarding its etiology. The rôle of a previous attack of ordinary appendicitis in determining subsequent tuberculous infection is disputed. The prevailing opinion seems to be rather that tubercle favours the development of ordinary inflammation of the appendix than the converse. Letulle even expresses the opinion that there is a certain antagonism between the development in the appendix of the bacillus of Koch, and of the ordinary organisms of appendicitis.

Most observers seem now to incline to the view that it is not necessary that the appendix should be occluded at its base, and so converted into a closed cavity, in order that the tubercle bacillus may obtain a footing, as was held by Talamon and Dieulafoy. The predilection of the appendix for this and other forms of infection depends on the large amount of lymphoid tissue entering into its histological structure, and on its relationship with the cæcum, where, as Reclus puts it, it forms "the diverticulum of a diverticulum." The tubercle bacillus may reach the appendix by way of the intestine, which is probably much the most common, if not the invariable, route of infection, being carried thither in milk or other food materials, or in sputum which has been swallowed. It probably never, according to Letulle and Weinberg, passes from the peritoneum to the appendix. Infection by the lymph or by the blood stream is quite exceptional.

Morbid anatomy.—Cases may be grouped according to the nature and extent of the lesions. In the mildest cases the appendix may look perfectly normal to external appearance, and on section all that is found is a small area of semi-transparent, greyish granulation tissue, representing the infection of one or more follicles with tubercle. In other cases the tubercle nodules are larger and caseating, and may project on the surface of the appendix, particularly towards its free extremity. Sometimes there is a general tuberculous infiltration of the whole organ, which is thickened and apparently hypertrophied, so that it may almost approximate in size to the small intestine. In more advanced cases the mucosa shows one or more definite ulcers with all the characters common to tuberculous ulcers of mucous membranes. The ulcers may run together, so that the whole mucosa is one large ulcerated surface. Perforation may ensue from such ulcers destroying the thickness of the wall, and an abscess may slowly form in the iliac fossa. It is interesting to note that these abscesses sometimes reach an enormous size, and they may open into the bowel, into the general peritoneal cavity, or into the skin surface, simulating the cold abscesses associated with tuberculous disease of the spine. Atrophic and cystic forms of tuberculosis of the appendix have been observed, but they are rare. The infection may spread from the appendix to the cæcum, the peritoneum, or the lymphatic glands. Microscopically the changes are those common to all tuberculous lesions. The process begins in the mucosa and spreads centrifugally.

Clinical features.—In answer to the question, Does there exist clinically a tuberculous appendicitis? the author replies "undoubtedly yes," although he admits that it is seldom possible to recognise it with certainty. Sometimes the condition remains *latent*, and the lesion is only discovered on dissection. The *acute form* simulates the ordinary acute appendicitis in nearly all its features, the only outstanding point of difference being that in the tuberculous form diarrhœa is the rule. But as diarrhœa is sometimes present in the ordinary forms, and constipation may attend the tuberculous, there is little on which a diagnosis may be based. The *chronic form* is much the most common. The attacks are mild, the pain not acute, vomiting less frequent, and diarrhœa of such frequence that it is a valuable diagnostic sign.

The condition may end in resolution, but shows a marked tendency to recur; it may give rise to peritonitis, generalised or encysted, by perforation; or a localised cold abscess may form. The use of tuberculin as a diagnostic measure in doubtful cases is recommended. The prognosis is more serious than in ordinary appendicitis, and the treatment is carried out on the usual well-defined lines.

Appendicular Femoral Hernia.

Alfred C. Wood of Philadelphia has collected the records of 100 cases in which the vermiform appendix alone has been protruded in a femoral hernia (*Ann. Surg.*, Phila., 1906, May). Of these, eighty-one were in women, seven in men, and in twelve the sex was not stated. The youngest patient was 19 years of age, five were in the third decade, five in the fourth, twenty-five in the fifth, eighteen in the sixth, thirteen in the seventh, nine in the eighth, and one patient was 87 years of age. This is in marked contrast to the age of patients suffering from cæcal hernia, of whom 50 per cent. are under 15 years of age, and 60 per cent. are under 40. It is worthy of mention that involvement of the appendix alone, in some instances, gives rise to symptoms characteristic of strangulated intestinal hernia, which is evidently the result of reflex nerve action, as it is improbable that any organic obstruction is caused by the incarceration of the appendix. Flexion and restricted movement of the thigh has frequently been observed, apart from strangulation. This is probably due to contraction of the appendix after it has become adherent to the sac, so that free extension of the thigh makes undue traction on the cæcum. A herniated appendix is apt to become adherent and inflamed, and, as a matter of clinical experience, this danger appears to be greater when it occupies the sac alone than when it is accompanied by other portions of the intestine. In most cases the diagnosis has only been made at the operation. In all cases it is advisable to remove the appendix.

The Determination of the Functional Capacity of the Kidneys.

Considerable difference of opinion exists among authorities on the value of cryoscopy in determining the functional capacity of the kidneys. Casper and Kümmell believe that the cryoscopic index of the blood, and of the combined and separate urines, furnishes the best indication of the activity of the kidneys, whereas Rovsing, Israel, and others maintain that these methods are uncertain and unreliable. A. A. Berg of New York (*Ann. Surg.*, Phila., 1906, May) does not belong to either of the extreme schools. He sums up his views thus: (1) A normal cryoscopic index of the blood, when there is one healthy and one diseased kidney, would indicate a potentially sufficient capacity of the sound organ, and would warrant us in doing a nephrectomy. (2) An abnormally low cryoscopic index of the blood, when there is one healthy and one diseased kidney, does not indicate potential insufficiency of the former, for the function of this organ may be only temporarily impaired by the diseased fellow organ. In such cases nephrectomy may nevertheless be done safely. (3) A normal cryoscopic index of the blood, when there is one slightly diseased and one extensively diseased organ, would usually point to a potentially sufficient functional capacity of the less diseased organ, and would allow of our doing a nephrectomy or other operation upon the more affected kidney. (4) A normal cryoscopic index of the blood, when there is more or less extensive affection of both kidneys, does *not* mean a potentially sufficient functional capacity of these organs, and does not permit of our removing one or even of incisively attacking either organ. (5) An abnormally low cryoscopic index of the blood with more or less extensive disease of both kidneys indicates their potential insufficiency, and strongly speaks against the advisability of doing any operation upon them.

A cryoscopic index of the separated urines affords a clue to the functional activity of the individual organs, as does also a comparison of the percentage of urea in each of the separated urines. Neither the phloridzin nor the methylene-blue test can be relied upon for determining the health or disease of the kidneys, nor do they afford reliable data of the potential functional power of these organs or of their actual work.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Uterine Myomata and Malignant Disease.

Cullen (*Journ. Am. Med. Assoc.*, 1906, March 10) calls attention to the danger of incomplete examinations after hysterectomy as regards the possible existence of malignant disease. As the result of the frequency with which myoma is associated with cancer, he recommends that in all cases the uterine cavity should be opened immediately after removal of the tumour. He reports a case of supra-vaginal hysterectomy for what was supposed to be simple interstitial and subperitoneal fibroid. Two years later sudden collapse occurred, due to hæmorrhage from sarcoma of the cervical stump. Re-examination of the original tumour showed typical sarcomatous changes in the myoma. The patient died eight months after a second laparotomy, rendered necessary on account of intestinal obstruction.

Malignant Degeneration of Fibroids.

Winter (*Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1896, April) believes that there is a direct connection between cancer and uterine myomata. He finds cancer of the cervix in 2 per cent. of all cases, while cancer of the body of the uterus occurs in no less than 1·2 per cent. In the absence of fibroid disease, cancer of the cervix is fifteen times more common than that met with in the fundus. Winter, however, believes that this should not influence the question of operative *versus* expectant treatment, and does not insist on complete hysterectomy as the operation of choice in all cases. Hæmorrhages about the time of the menopause are the most suspicious symptoms. Sarcomatous degeneration was found in 5 per cent. out of a collection of 753 cases of uterine fibroid. The recognition of sarcomatous degeneration is very difficult. The development of metastatic growths is frequently the sign which first makes the occurrence of malignancy evident.

Cæsarean Section in Death from Cardiac Disease.

Nacke (*Centralbl. f. Gynäk.*, Leipzig, 1906, February 17) describes a fatal case of mitral stenosis with marked hypertrophy of the right ventricle. The child was delivered alive after the mother had ceased to breathe, but died probably as the result of too violent efforts at artificial respiration. He does not consider it justifiable to operate when the patient is moribund, as no better results are got for the child, and the administration of an anæsthetic is impossible.

Cæsarean Section in the Death Agony.

R. Lumpe (*Centralbl. f. Gynäk.*, Leipzig, 1906, February 17) quotes Runge in describing the indications for this operation as follows:—"When the diagnosis and prognosis of the physician tend to show that the maternal death is inevitable, the child living, and delivery *per vias naturales* gives no hope for the mother, Cæsarean section gives the best chance for the child." Lumpe describes the following case:—Mother had cerebral hæmorrhage with left-sided hemiplegia, and Cheyne-Stokes breathing, followed by coma. A living child was delivered by Cæsarean section, the mother's death being caused by an organised hæmatoma over the left hemisphere.

Removal of the Ovaries in Hysterectomy for Fibroma.

Rochard (*Bull. gén. de therap., etc.*, Paris, 1906, February 8) considers that there is no advantage in leaving an ovary after total hysterectomy. A subsequent operation may have to be performed to remove the degenerated ovary. He believes that the supposed internal secretion of the ovary, and discomfort from a prematurely induced menopause, are not to be considered in such cases, and insists on completely removing the adnexa at the time of the uterine operation.

Full-term Tubal Pregnancy.

Amos (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. liv. Heft 1) reports the following case:—P., 35, one child eleven years before, expected her second confinement in February 1905, when she complained of labour-like pains, without result. After waiting two months she went to hospital, where the condition was diagnosed as extra-uterine gestation. On section, a smooth-walled tumour like a uterine fibroid was discovered, which proved to be a sac containing a full-time fœtus. The placenta, which covered a considerable area of the inner wall of the sac, had at one point perforated the wall, and become adherent to extra-peritoneal tissue. Microscopical examination showed that the ovum was entirely inside the tube.

RÖNTGEN RAYS IN EXTRA-UTERINE GESTATION.

LICHTENSTEIN (*München. med. Wchnschr.*, 1906, March) reports a case of intra-abdominal tumour, diagnosed as ectopic pregnancy previous to operation. He believes that an X-ray examination should always be made in cases of abdominal tumour where the possibility of advanced extra-uterine gestation cannot be excluded from the clinical symptoms alone. In such cases the fœtal parts and the position of the child are much more distinct on X-ray examination than in uterine gestation. This is accounted for by the thinness of the fœtal sac, the smaller amount of amniotic fluid, and non-interference of the uterine walls and placenta with the rays.

RUPTURE OF THE UTERINE CICATRIX AFTER THE CÆSAREAN OPERATION.

COUVELAIRE (*Presse méd. belge*, Bruxelles, 1906, March) reports the following case:—P., with contracted pelvis, was delivered by Cæsarean section. The uterine incision was sutured *en masse*. A second pregnancy terminated in an abortion at the second month. With the third pregnancy there was considerable hydramnios, and Cæsarean section was again decided on. Before operation, patient was seized with sudden severe abdominal pain, the pulse being 140. Laparotomy showed the fœtus free in the abdominal cavity, having escaped through the rent in the uterine wall. The case was successfully treated by the Porro operation. Section of the uterus showed that the placenta was implanted over the scar, and that the cicatricial tissue had undergone a good deal of thinning.

THE VALUE OF ERGOT IN OBSTETRICS.

DAVIS (*Therap. Gaz.*, Detroit, 1906, January) uses ergot in the great majority of cases of labour. It is contra-indicated after excessive hæmorrhage with empty vessels and feeble heart; for such condition saline transfusion (intravenous) and strychnia are employed; but when uterine contractions begin, ergot is given during convalescence to secure a permanent result. In forceps cases he gives 30 minims of "aseptic ergot" hypodermically as soon as the child is born. He believes in a combination of ergot and strychnine, the first to act on the uterine muscle, the second on the nerve ganglia and nervous system in general.

Hirst uses ergot as a routine practice. After anæsthetics he gives a hypodermic deeply into the thigh, if labour has been long, and in cases of hydramnios, twins, and placenta prævia. Krusen does not believe that ergot should be given in all cases of labour, but that a positive indication should exist, as when retraction and contraction of the uterus are unsatisfactory, and after chloroform cases. Ergot is valuable combined with strychnine in preventing puerperal sepsis if the uterus is relaxed. Good contraction is set up, which by diminishing the internal surface renders infection less liable to transmission through the sinuses and lymphatics, and involution is also promoted. He believes that in post-partum hæmorrhage ergot is not so effectual as intra-uterine manipulation, or packing the uterus with sterilised gauze.

THERAPEUTICS.

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X-Rays in Leukæmia.

The treatment of leukæmia by the Röntgen rays seems to afford at present the best means of influencing the course of the disease. We are still unable to say definitely in what manner the rays act. According to one view, they act directly on the white cells in the blood or on the tissue elements in the spleen and marrow from which the white cells originate. A more recent view is that under the action of the rays a toxin arises in fluids containing large quantities of white cells. This toxin—leuko-toxin—is thermo-labile, and is rendered inactive by heating to 55° to 60°. Curschmann and Gaupp (*München. med. Wchnschr.*, 1905, No. 50) have investigated this leucolytic action. They used serum obtained from a case of spleno-medullary leukæmia which had improved greatly under ray treatment. They claim that this serum in considerable dilution causes disappearance of the leucocytes from a suspension of white cells if the serum and suspension are mixed and kept warm for several hours. The serum rendered inactive by heating loses this power. Similarly, injection of the serum into rabbits exerts an influence on the number of leucocytes circulating in the peripheral blood. They claim that the immediate effect of the injection is to produce a leucopænia succeeded by a transient hyper-leucocytosis, which, four or five hours after the injection, gives place to a pronounced secondary leucopænia, which lasts for some hours. They ascribe this diminution to a true leucolysis. The inactive serum causes no secondary leucopænia.

Klieneberger and Zöppritz, in a recent paper, put forward serious theoretical objections against this leucolytic action, and in an elaborate series of experiments they find that the serum of human beings who have been exposed to ray treatment does not acquire any leucolytic power, whether it be tested against the white cells of healthy individuals, leukæmic patients, or rabbits. Further, the intravenous injection of such serum in the rabbit is not followed by any constant phenomena.—*München. med. Wchnschr.*, 1906, Nos. 18 and 19.

SAJODIN.

VON MERING and Emil Fischer (*Med. klinik*, 1906, No. 7) describe a new iodine preparation, which they claim is superior to iodipin in several respects. They have investigated the series of salts of the higher molecular mono-iodo fatty acids. These salts are tasteless and insoluble in water. The calcium salt of moniodobehen acid is readily obtained in a pure condition. The formula is $(C_{22}H_{42}O_2I)_2Ca$. It is a colourless, tasteless, and odourless preparation, containing 26 per cent. of iodide. It keeps well if protected from light. Exposed to light, it turns slightly yellow without suffering any decomposition. Under the trade name of sajodin it has been put upon the market as a substitute for potassium iodide in cases where that salt causes iodism. The dose required varies from 15 to 45 grs. per diem; but if required, this can be raised to 90 grs. Several clinical reports have been published which are highly favourable to the new preparation. Roscher (*Med. klinik*, Berlin, 1906, No. 7) has used it in thirty-nine cases of syphilis and one of arteriosclerosis, and finds that the drug is well borne, acts promptly and efficiently, and even in cases of iodide idiosyncrasy causes only minimal reaction. His cases are not very convincing, as in most instances the effect was confused by the simultaneous administration of mercury. A series of upwards of 100 cases reported by Meyer (*Dermat. Ztschr.*, Berlin, 1906, Heft 3) is more convincing, since it represents cases in which the drug was administered apart from other medication. Sajodin acted well in cases of tertiary syphilis. Patients of all ages took it without difficulty, and no unpleasant side action developed.

SPINAL ANÆSTHESIA IN MEDICAL PRACTICE.

SPINAL anæsthesia stands midway between cerebral and peripheral anæsthesia. It is useful where a general anæsthetic is dangerous and where local anæsthesia is insufficient. Hitherto the method has chiefly been employed in surgical operations, but Lazarus points out that it is serviceable in certain medical cases. In spinal anæsthesia not only sensation but also the power of movement is inhibited. The resulting muscular relaxation is particularly useful in the manipulation of stiffened joints or passive nerve stretching in sciatica. In certain spinal conditions attended by pain or motor irritation, spinal anæsthesia sometimes proves useful where other analgesics fail. Thus Lazarus has used it in the painful crises of locomotor ataxia, in exaggerated twitching of disseminated sclerosis, and in one case of painful paraplegia from cancer of the spine. Unfortunately, in such cases the benefit ceases with the disappearance of the anæsthesia. Further, spinal anæsthesia may be used to facilitate abdominal palpation and to differentiate hysterical contraction of the legs.—*Ztschr. f. diatet. u. physikal. Therap.*, Leipzig, 1906, April and May.

SUBCUTANEOUS USE OF IRON.

MOUTIER has a short communication which shows that the subcutaneous injection of an iron salt is followed by rapid improvement in anæmic conditions. The salt employed was a glucosate of iron. Of this 5 grs. were injected every second or third day till in all ten injections had been given; after which treatment was stopped, though in exceptional cases a second or even a third course was required. The injections were made very slowly into the fatty part of the buttock. They caused no inconvenience. The patients selected presented typical types of anæmia. They were not confined to bed. Under the treatment the red corpuscles uniformly showed some increase in number, and the hæmoglobin also rises. Of special interest is the course of the colour index. When the number of red corpuscles shows only an increase of less than a million, the increase of hæmoglobin keeps pace, so that the relative value of the individual corpuscle remains unchanged. But when there is great numerical increase in the red, the hæmoglobin is apt at first to lag behind, so that the corpuscular value falls at first, but afterwards rises. This indicates that in such cases regeneration consists of two stages. In the first the red corpuscles increase in number, while their hæmoglobin value remains stationary or more frequently falls. In the second stage each individual corpuscle perfects itself and becomes richer in hæmoglobin.—*Arch. gén. de méd.*, Paris, 1906, No. 14.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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ACTINOMYCOSIS OF THE PELVIC ORGANS.

JOSÉ VEROCAY of Prague (*Verhandl. d. Deutsche Path. Gessellsch.*, Jena, 1906), at the meeting at Meran in September 1905, reported a case of actinomycosis in a girl æt. 14. She first came under observation on 14th July 1902. She had had leucorrhœa since Easter of that year, although menstruation had not begun. On 6th July she observed a swelling in the abdomen, which spread from right to left side, and was of greatest resistance and tenderness on the right. On the right of the anus there was an unopened abscess of three weeks' duration, and though the bowels were loose there was no diarrhœa. The patient was tolerably well grown, weakly, and thin. The mammæ and pubes were not developed. The abdomen above the umbilicus was depressed, and neither the liver nor spleen were enlarged. The lower part of the abdomen and the pelvis was occupied by a tumour which could also be felt per rectum as a hard mass towards the front and the right side. The abscess to the right of the anus was about the size of a walnut, and was pointing towards the skin. It burst on the 5th August, discharging a thick bloody pus. Fever, weakness, and vomiting became pronounced, and she gradually sank. She died on 1st September, the nature of the tumour remaining undiagnosed, though arcoma and tubercle were both suggested.

Post-mortem.—The lungs and bronchial glands were free from tubercle, but the cortex of the kidney was riddled with small white areas thought to be miliary tubercles. The colon showed catarrh, but its mucous membrane was intact, except in the rectum, where it was ulcerated. The pelvic contents were matted together by adhesions containing a soft cheesy-looking material. The ileum and great omentum closed in the adhesions above. The uterus, whose shape was preserved, lay in the midst of the adherent mass. The ovaries and tubes could not be easily seen. They were imbedded in adhesions in which were many varying sized masses of the same soft cheesy-looking material. The periproctal connective tissue was everywhere thickened, and a fistulous channel could be traced from the ischio-rectal abscess to the rectum opening upon its mucous membrane 7 cm. above the anus. The mucous membrane of the rectum was at many other points driven in, undermined, and so thinned that it was easily torn. The recto-vaginal septum was thickened and infiltrated with the cheesy material, and the mucous membrane of the vagina overlying this showed a worm-eaten-like ulceration. The vesico-vaginal septum was affected to a less degree. The bladder itself was unaffected, except for a small papilloma, probably of independent origin. The cheesy or purulent material which everywhere channelled the pelvic organs could be traced to the abscess near the anus, and thence to the skin, where it had discharged itself before death. No diagnosis other than tubercle had yet been made. Various portions were prepared for microscopic examination, and stained in hæmotoxylin and Van Gieson, and it was only after several slides had been examined that a diagnosis of actinomycosis was made. The pus and the necrotic tissue contained the typical actinomycotic grains in very small numbers. Throughout the greater part of the tissues they were so altered and destroyed as to be scarcely recognisable. Clubs were seen in some of the colonies and the mycelium-like threads also, though the latter were very difficult to make out. Gram's method did not succeed in demonstrating them as it usually does so clearly. This puzzled the author considerably, and he was inclined to think it was due to imperfect fixation. The actinomyces colonies were most numerous in the region of the ovaries, tubes, and the recto-vaginal septum. The miliary points in the kidney were not examined microscopically, and their true nature was thus undetermined. In seeking for the starting-point of the disease, the author found himself somewhat at a loss. The oldest disease was either in the region of the ovary and the tubes or of the uterus, or in the recto-vaginal connective tissue. Infection from the rectum was possible, but he could find no sign of an entrance point, since he regarded the rectal opening already described as clearly produced by burrowing from without not from within. It is probable that the same suggestion holds good for a uterine or vaginal entrance. He quotes Rosenstein in saying that the majority of cases of reported actinomycosis of the pelvic organs took their origin in the intestine. At the discussion on Verocay's paper, Schlagenhaufer stated that he had seen two cases of actinomycosis of the pelvic organs in that year, one in an 18-year old girl who came under treatment for parametritis. She had actinomycotic abscesses of the liver and left ovary and salpingitis. He believed the origin was an ulcer (actinomycotic) of the rectum, four finger-breadths above the anus, which had caused an actinomycotic phlebitis. He stated that he succeeded in obtaining a culture of actinomyces from the Fallopian tube. The other case occurred in a governess, æt. 38, who had long suffered from actinomycosis of the lower jaw. In this case abscesses were found in the lungs, pleura, peritoneum, liver, spleen, and one ovary and one tube. These communications can hardly be said to throw any light upon the difficult question of the origin of ovarian actinomycosis, and the author has hardly made the best use of his opportunities.

The Intestinal Origin of Pulmonary Anthracosis.

Vastenberghe et Grysez (*Ann. de l'inst. Pasteur*, Paris, 1905, tome xix. fasc. 12) produced anthracosis in the lungs of adult guinea-pigs by mixing carbon dust with their food. Animals killed twenty-four to forty-eight hours after a single meal of this character show carbon particles in both the upper and lower lobes of the lungs, and the bronchial glands are swollen and black, whilst the mesenteric glands are unaffected. When young guinea-pigs are used, the mesenteric glands are affected, and the lungs and bronchial glands escape. China ink or carmine can be substituted for carbon, and introduced directly into the stomach suspended in water by means of an œsophageal tube, and the same result is obtained, *i.e.* pulmonary and bronchial pigmentation when adult guinea-pigs are used, and mesenteric when young ones are employed. This bears out what Calmette and Guerin found in the case of tubercle, so that it is probably a universal law that the mesenteric glands of young and adult animals subserve different functions. The authors then sought to determine if ordinary pulmonary anthracosis arose in this way. Animals killed after a short period of exposure to black fumes showed the nose, mouth, epiglottis, pharynx, and sometimes also the œsophagus full of carbon, but the trachea, bronchi, and lungs always quite free. On the other hand, if the exposure to the black fumes lasted a longer time, the respiratory organs are also invaded, the pulmonary alveoli in particular being affected. In rabbits, which respire exclusively by the nose, the duration must be very prolonged, and even then the pulmonary alveoli are not always invaded. In rabbits in whom there is a shorter duration of exposure, the black particles are found in the lung parenchyma, but not in the alveoli or bronchi, which suggests the intestinal path of entrance. In rabbits whose œsophagus had been blocked previously to causing them to breathe a carbon laden atmosphere, no pulmonary anthracosis was found, although it was abundantly seen in those of other rabbits used as controls whose œsophagus had not been blocked. In another series one main bronchus was blocked, and in the corresponding lung carbon particles were seen in the lung parenchyma, but not in the alveoli, though in the other they were seen not only in the parenchyma, but in the walls of the alveoli and of the bronchi. They thus conclude that physiological anthracosis is due in most cases to intestinal absorption.

The Transmission of Syphilis to Monkeys.

A. Neisser, G. Baermann, and Halberstädter (*Deutsche med. Wchnschr.*, Leipzig, 1906, January 4, 11, and 18) give the results of their experiments on the transmission of syphilis to monkeys in the island of Java, where they could obtain as many monkeys as they wished. Notwithstanding that they operated on about 900 monkeys, their results can hardly be said to add much to the discoveries of Metchnikoff, Roux, and others. The period of incubation varied from three to five weeks on the average, with a minimum of fifteen and a maximum of sixty-five days. The lesions varied much even when the inoculations were made with the same virus. As a rule, the virus was best when taken from man or the higher monkeys, though there were many exceptions. The virus was most active when taken during full evolution of the disease. Primary sores when recent and moist gave shorter periods of incubation, and more constant results than sores on the way towards healing. The lymphatic glands mostly gave a good material for inoculation. This was also true of the secondary lesions, both mucous plates and papules. Inoculation of tertiary products, taken from the interior of a gumma, gave positive results in two or three cases, and it was a curious fact that in two of them the incubation period was very much prolonged, the primary sore not appearing for sixty-eight days in one (a gibbon), and for fifty-one days in the other (a macacque). Neither the blood nor serum of human syphilitics ever succeeded in inoculating monkeys with syphilis. Inoculation of the spinal cord, the liver, the lungs, the kidneys, the muscles, and suprarenal capsules of syphilitic monkeys never produced the disease in other monkeys, whilst those of the spleen, the bone marrow, and the testicles often gave positive results. Neither the evolution of the disease nor the aspects of the lesion permit of deductions being made about the quality of the virus. The authors do not believe in, though they do not categorically deny, the attenuation of the virus by passage. They are more inclined to admit an exaltation. In higher monkeys inoculation often succeeds, no matter what part of the body is used; whereas in lower monkeys it only succeeds when the eyebrows or genital organs are used. Orang-outangs show loss of appetite, depression, and frequently intestinal troubles shortly after inoculation, whilst gibbons show no general disturbance until the secondary lesions appear. Subcutaneous inoculations have always failed both in higher and lower apes. Subperitoneal inoculation similarly failed. The authors tried in various ways (sealed tubes, glycerin, chloroform, paraffin, desiccation), to preserve the virulence of the poison, but did not succeed in doing so for more than a few hours. Mercury is stated by Neisser to have no retarding effect upon the generalisation of the virus even when used immediately after inoculation. Contrary to expectation, the virus is rarely if ever found in the internal organs of the higher apes, inoculation of nine orang-outangs from the spleen or bone marrow proving in all cases innocuous; whereas in the lower apes, the internal organs keep the poison for months. The last part of the long paper by the authors is devoted to the *Spirochæte pallida*, but it contains nothing new.

DERMATOLOGY.

UNDER THE CHARGE OF

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THE PATHOGENY OF BROMIDE ERUPTIONS.

PASINI (*Ann. de dermat. et de syph.*, Paris, 1906, January) has made a study of this in the case of a woman, æt. 25, who had long suffered from indigestion associated with persistent achlorhydria and diminished gastric acidity. Doses of bromide of potassium and sodium of from 15 to 30 grs. daily were soon followed by a cutaneous eruption of a papulo-pustular vegetating type, which steadily extended in area and intensity while the drug was being taken, improved on its temporary discontinuance, and slowly and finally vanished when its use was abandoned. Besides this, while the bromides were being taken, the thyroid gland swelled to double its usual size, the urine was scanty, alkaline, contained phosphates and albumin, and a notable amount of bromine. The presence of bromine in the pus secreted in the eruption was not, however, established. Sections of an excised portion of the eruption showed proliferation of the epidermis, with accumulation of leucocytes in the down-growths and in the corium. But the special change which he has noticed concerns the connective tissue cells. If the attention be concentrated on the capillaries filled with white blood cells, it is seen that the connective tissue cells which form their walls have lost their normal mutual cohesion, as a result of swelling of their protoplasmic prolongations. At the extremities the protoplasm becomes rarified, loses its granuloplasm, and is transformed into a substance having a frothy aspect, which is readily coloured by such stains as acid orcein, etc., which attach themselves to the spongioplasm. The nucleus becomes slightly swollen. The cells instead of their elongated or bifurcated shape assume a rounded form, separate one from another, and thus admit of free migration in the œdematous tissue in the neighbourhood of the leucocytes contained in the vessels. They merge into a globular mass made up of a reticulum of round meshes, but having a well-preserved nucleus in the centre. When the connective tissue cells have attained this stage of transformation, they engorge into their frothy protoplasm neutrophile polynuclear leucocytes even to the number of six. These included leucocytes lose after a time their morphological integrity, both nucleus and protoplasm become disintegrated, and so many particles of chromatin are irregularly dispersed throughout the texture of the connective tissue cell. At last the transmuted cell itself breaks up, allows the escape of these particles, and melts down in midst of the still persisting elements of the œdematous tissue. Thus there are two principal stages in this modification of the connective tissue cell—one intermediate, the alteration into froth or foam cells; a second terminal, in which they acquire a property not heretofore attributed to such modified cells, that of absorbing the white cells and of exercising a phagocytic power. The foam phagocytes constitute a new element in histo-pathology. They have their origin from the ordinary foam cells of Unna, and like them are a product of the œdematous degeneration of connective tissue cells with disappearance of the granuloplasm and morphological modification of the spongioplasm. Among the anatomico-pathological alterations in bromide eruptions, these foam phagocytes represent the etiological symptom which differentiates this process from all others, a circumstance which we encounter very frequently, and which dominates other changes in the corium. They ought therefore to be regarded as the most characteristic feature of the bromide eruption. The view generally held to explain the cutaneous eruptions following bromides has been, that such were a product of the irritation directly exercised by the drug on the sebaceous glands and their encircling vessels. Yet only one observer, Guttmann, has succeeded in detecting bromine in the contents of pustular eruptions. Proceeding on the reasoning that bromine has the power of abstracting hydrogen from the organic molecule, of setting free nascent oxygen, and itself entering into combination with organic substances, Pasini was led to inquire whether it was not possible for bromine in combining with the albuminoids of the tissues to undergo a modification which no longer permitted of its detection by the usual methods based on the employment of chlorinated water, or of hydrochloric acid and chloroform. This idea, he discovered, was well founded if artificial solutions of bromides in an albuminous water were prepared, for the tests failed to reveal their presence. He thus concludes that bromine in contact with albumin combines with its molecules, and forms a union in which the bromine is masked. But by converting the bromine so combined into a silver salt, he was able to establish its presence. The toxic substance is free bromine, which is derived from the ingested bromides by a special pathological process, related, he thinks, to the condition of achlorhydria of the gastric juice. The free bromine penetrates into the circulation, comes in contact with the tissues, and exercises on them a double effect; a chemiotactic action giving rise to clinical manifestations, the formation of groups of leucocytes; and a degenerative one, exerted on the connective tissue cells, setting up a process solely appreciable by histological examination, namely, the production of foam phagocytes.

A Contribution to the Question of Angiokeratoma.

Frohwein (*Monatsh. f. prakt. Dermat.*, Hamburg, 1906, April 1) observes that the two names most prominently associated with this disease are those of Mibelli, the first to isolate it, and Pringle, who has provided a histological account current even now. On the basis of old-standing chilblains, and in those usually weak and anæmic, about the age of 12 or 13, there develop on the extensor aspects of the hands and feet, seldom elsewhere, small bluish-red spots, showing in their centre a specially bright point, which under pressure by the diascope, causing fading of the cyanotic hue, becomes more distinct. As these enlarge, vascular convolutions appear in the middle, the surface assumes a firm semi-translucent though not scaly aspect, and rises to the height of a millet seed. Longer persistence changes these into warty or spiny bluish-red or dusky-grey structures. Dark-red puncta of dilated vessels can be seen within. The eruption is frequently symmetrical, may last many years, or vary with the season. Few fresh spots come out after the age of 20 to 30, but it is not determined if complete spontaneous involution occurs. Colcott Fox, however, noticed their disappearance shortly before death in a phthisical young woman. Except slight itchiness, there are no subjective sensations. It is from cosmetic reasons that advice is sought. Certain variations from these characters have been recorded, but the main facts are fairly uniform. The microscopic examination of a case revealed a thickening of the stratum corneum with loosening of the deeper layers and the formation of longitudinal spaces filled with coagulated blood and detritus. The stratum lucidum was broader than normal. No openings of the sweat glands were present in the circumferential parts, and no hair or sebaceous glands were visible anywhere. The germinative layer was moderately enlarged, and sent prolongations deep into the corium. At a later stage wide spaces were found over the papillæ, which ultimately blended into cavernous areas. The blood vessels in the papillæ were club-shaped, tortuous, and irregular. Near the vessels were marked evidences of inflammation, with small cell infiltration. There is a certain relation between angiokeratoma and lupus pernio, as there is between lupus pernio and lupus vulgaris, and, though traces of a local tuberculosis were absent,—no tubercle bacilli and few giant cells have been met with in lupus pernio,—yet Frohwein is disposed to rank both in the group of tuberculides.

Pityriasis Rosea.

Montgomery (*Journ. Cutan. Dis.*, N.Y., 1906, April) has studied the conditions under which this appears from a series of thirty-eight cases. The rash consists of slightly elevated, light-red blotches, usually about the size of those seen in the roseola of syphilis. Closely inspected, many are actively desquamating, and here and there a ringed patch will be found. The outer circle of the ringed patches consists of a bright red line; the centre is buff coloured, and either branny or forming fine parallel wrinkles. The patient is almost invariably in good general health. He states that it was first noticed on some part of the trunk and quickly spread, accompanied, perhaps, by some itchiness. This absence of itchiness is important, as it is regarded as evidence of its syphilitic nature, the gravest and most likely error one may commit. Though seldom seen till it has extended considerably, most instances begin by what Brocq has termed a "primitive patch." This is supposed to commence, as the other later blotches do, as a small red spot, subsequently becoming buff coloured in the centre and spreading at the periphery by a thin red border. Montgomery has never seen the initial lesion existing alone, but has identified it afterwards partly from the patient's assertion, and partly from its being larger and having more marked characteristics. Opinions as to the nature of the disease differ. Some hold it due to local infection, others that it is a constitutional disorder due either to an infection accompanied by a rash on the skin, and therefore analogous to the exanthemata, or to some poison generated in the alimentary canal, and therefore related to urticaria. Till recently it was called tinea corporis maculata, yet no fungus has been discovered. It spontaneously clears up, the natural evolution being stated as about six or eight weeks. While in some examples various constitutional symptoms have been encountered, none of these are constant or extraordinary. There is often a close resemblance between it and seborrhœa annulata, yet in his series only six were frankly seborrhœic. The appearances favour, no doubt, the impression that it is a local parasitic disease, and the results of treatment support this. He believes that the mode of treatment first suggested by the abstractor certainly shortens its course. This consists in soaking daily for from twenty minutes to half an hour in a warm bath containing from half an ounce to an ounce of Condy's fluid, and then, after drying, to rub in a 3 to 5 per cent. salicylic vaseline.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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Ataxia in Childhood.

In this paper Batten discusses certain forms of ataxia occurring in children which are neither associated with Friedreich's disease, diphtheritic paralysis, nor occur in connection with tumours or lesions of the cerebellum and mid-brain. He classifies these cases as cerebellar diplegia, and divides them into the three following groups:—(1) Cases in which ataxia has been noted early in life, and in which there is a tendency to gradual improvement (congenital cerebellar ataxia). (2) Cases in which ataxia has developed suddenly after some acute disease in a child previously quite healthy (acute ataxia). (3) Cases in which a child has been healthy to a certain age, and then gradually developed ataxia resembling Friedreich's disease (progressive cerebellar ataxia).

The following may be taken as the leading features of Group 1. *Congenital cerebellar ataxia.*—A child whose backward development is evidenced by the late period at which he acquires the power of sitting, walking, and talking, is noticed when a few months old to tremble when using his hands. On the child learning to sit up, it is noticed that the head shakes, and that the whole body is in constant oscillation, and that nystagmus is present when the child attempts to fix the eyes. When he attempts to stand there is great unsteadiness, and when he learns to walk the legs are thrown about in a very ataxic manner. These children speak in a slow, jerky, and monotonous manner, are slow eaters, and though they can swallow fluids easily, solids are swallowed very slowly. They are well nourished, take an intelligent interest in their surroundings, have good muscular power, and are clean in their habits. As they grow the ataxia of their arms and legs becomes less, their articulation improves, and in the slight cases normal development takes place. None of the ordinary symptoms of cerebral diplegia exist in these cases. There is no rigidity of the limbs, but rather hypotonia of the muscles. The knee-jerks are brisk, there is no ankle closure and no definite persistent extension of the great toe, and there is neither athetosic nor choreic movements present. In the cases under consideration it is probable that there has been some damage to, or lack of development of, the cerebellum at the time of birth, for it is well known that great deficiency of the cerebellum may exist without any marked or persistent symptoms. As the cerebrum becomes developed it assumes the co-ordinating function of the cerebellum, and recovery more or less complete frequently takes place.

Group 2. *Acute ataxia.*—The following are the characteristic symptoms:—A perfectly healthy child suffers from some febrile disease such as measles or influenza, during the course of which a period of unconsciousness may be present, but seldom do convulsions occur. During convalescence, and on the child attempting to sit up in bed, it is noticed he is unable to maintain his balance. There is marked inco-ordination of the hands, and if on his feet, he is wildly ataxic, and at the same time his speech becomes affected. In a short time his general health is restored, but the ataxia remains. Gradually, however, recovery takes place, sometimes in a few months, but more generally at a much later date. It is still in dispute whether these cases are of cerebellar or cerebral origin. Those who favour the view that the ataxia is cerebral bring forward the loss of consciousness, the affection of the speech, and the mental attitude as indicative of a cerebral lesion. Those who favour the cerebellar origin of the disease point to the character of the ataxia affecting the leg and trunk muscles especially, the absence of loss of power, the hypotonia of the limbs, and the character of the reflexes. The affection of speech is rather an affection of articulation, and the scanning, monotonous, and jerky character may well be the result of defective inco-ordination. What the exact nature of the central lesion may be still lacks pathological proof. That it is of vascular origin would seem probable from the sudden onset. The author inclines to regard these cases as similar in origin to acute anterior poliomyelitis, and considers that the cerebellar symptoms are due to a thrombosis occurring in the finer vessels of this region.

Group 3—*Progressive cerebellar ataxia*—is characterised by the following group of symptoms:—A child who has been perfectly healthy and of normal development till a certain age gradually develops ataxia, which slowly increases, so as ultimately to render the patient incompetent to get about. These cases in some points resemble Friedreich's disease, in others Marie and Sanger Brown's hereditary ataxy, but differ from these diseases in many particulars, so that, though undoubtedly allied to those conditions, they yet find a place not as a separate disease, but as a member of the group of cerebellar ataxia. One of the most typical cases of progressive cerebellar ataxia is that reported by Fraser in a brother and sister. The boy was healthy at birth, and when 3 years old unsteadiness was first noticed. When 6 years old the reeling was very marked, but he was able to walk about till the age of 30. The patient died when 33, and the following changes were found:—The cortical substance of the cerebellum was little more than half the normal thickness, and there were gaps on the surface, probably caused by collections of fluid. The grey substance appeared of undue thickness. The cells of Purkinje in the cortex were greatly shrunken, and their processes indefinite and altered. The weight of the cerebellum was 1260 grains, the average weight being 2640 grains. The prognosis in cases of this group is invariably bad. As with the cerebral diplegia, so with the cerebellum, the cases may be either natal or prenatal, acquired from acute disease, or progressive with steady deterioration. The tendency to improvement is, however, greater in cerebellar cases, and when symptoms occur demonstrating degeneration they are slower in development.

In conclusion, the author draws attention to three conditions which may give rise to symptoms closely approximating those described in this paper. These conditions are—(1) Disseminated sclerosis, (2) quiescent cerebellar tumour, (3) post-meningitis and hydrocephalus.—*Brain*, London, 1906, February, p. 484.

THE "FOURTH" OR FILATOW-DUKE'S DISEASE.

UNRUH (*Deutsches Arch. f. klin. Med.*, Bd. lxxxv., 1905, October) describes the eruption the "Fourth" disease as consisting of small, slightly raised, isolated or confluent puncta, not so large as those of measles or German measles, and with or without a general erythema. It is bright red in colour, and occurs all over the trunk and legs and in patches on the face; the lips, chin, and nose generally show no eruption. The hypogastrium and inner sides of the thighs are less affected here than they are in scarlet fever; the extensor aspects of the arms and the regions of the joints (especially those of the hands) show the eruption very markedly. The rash usually begins to fade in twenty-six to thirty-six hours, always remaining red, and never browning. Desquamation follows immediately, and lasts up to two weeks; the scales shed are small, and never lamellar as in scarlet fever. Petechiæ have not been seen. The mucous membranes often exhibit a slight catarrh, but never any eruption. At the onset the temperature always rises a few degrees, returning to the normal by the third day at latest. The pulse quickens, but only in proportion to the temperature, not in proportion to the intensity of the rash. The lymphatic glands enlarge little or not at all: this is one of the most important distinctions from German measles and scarlet fever. The heart is never affected; a slight transient dyspepsia may occur, and a transient albuminuria has been observed in the third week. Neither measles, German measles, scarlet fever, nor the fourth disease give protection from infection of the other three. Unruh has observed the fourth disease in patients from 2½ to 17 years, and he states the incubation period as fifteen days. He thinks it resembles German measles more than it does scarlet fever.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*June* 6, 1906.—Dr. J. O. **Affleck**, President, in the chair.—Drs. G. A. **Gibson** and W. T. **Ritchie** showed a series of tracings from cases of heart block.—Mr. F. M. **Caird** showed four examples of intestinal carcinoma removed from the pelvic colon and rectum.—Mr. **Wallace** showed the gall bladder and calculi from a case of septic cholecystitis. The following patients were shown:—By Dr. **Ritchie**, for Dr. G. A. **Gibson**, case of symmetrical trophic lesions of both thumbs, without definite symptoms of syringomyelia. By Mr. **David Wallace**, patient after cholecystectomy for septic cholangitis. By Mr. **Stiles**, two children after operation for Hirschsprung's disease.—Dr. **Aitchison Robertson** showed a new antidote and emergency case.—Dr. A. H. H. **Sinclair** read a paper on "The Early Diagnosis of Glaucoma by the Screen Test" (Bjerrum's Method), which will appear in an early number of this Journal.—Mr. **David Wallace** read a paper on "Tumours of the Bladder; why Operative Treatment is so frequently Unsuccessful in its Remote Curative Result: A Plea for Early Diagnosis." Tumours of the bladder are more common than is generally supposed. Recurrences after operation are common. Even in benign tumours operation is frequently unsatisfactory, probably because owing to the position of the tumour complete removal is difficult or impossible. It is important to diagnose the presence of a tumour early, and as there may be a tumour in the bladder for a considerable time before marked symptoms arise, the use of the cystoscope is of great value. Bleeding is the first symptom of simple tumours. Cancroidal tumours may cause so little discomfort as to be recognised only when it is too late. The symptoms, as a rule, are pain and frequency of micturition and pyuria; hæmorrhage appears later. Patients, as a rule, are about 60 years of age. If the tumour cannot be removed, suprapubic cystotomy is the best palliative measure. The most common benign tumours are papillomata. These may be sessile or pedunculated, and they do not infiltrate the bladder wall. It should be noted, however, that in time a simple tumour may become malignant, and this forms an additional reason for early operation. In operating for their removal it is important to open the bladder freely and see the tumour site. Trendelenburg's position and a Petersen's bag in the rectum are useful aids. These tumours are difficult to remove when situated near the ureters, as they so frequently are.

EDINBURGH OBSTETRICAL SOCIETY.—*June* 13, 1906.—Professor Sir HALLIDAY CROOM in the chair.—Specimens were shown by Professor KYNOCH, Dr. BARBOUR, and Dr. LACKIE.—Professor KYNOCH read a "Note on Post-Partum Ovariotomy." He referred to the recorded cases of ovariotomy during pregnancy and labour, and then related in detail three cases of post-partum ovariotomy in his own experience.—Professor Sir HALLIDAY CROOM communicated a paper entitled "In a Case of Heteroplastic Ovarian Grafting, followed by Pregnancy and a Living Child —who is the Mother?" He narrated the case which had been reported to him, and asked for the opinion of the Society. The paper gave rise to considerable and often amusing discussion, some discussing the point from the physiological aspect, some from the legal. Sir Halliday himself held that the child was illegitimate. Many of the fellows doubted the possibility of the occurrence, and felt that some ovarian tissue must have been left when oöphorectomy was performed on the "mother."—Professor Sir HALLIDAY CROOM also read a paper on "Malignant Endocarditis in Pregnancy, with an Illustrative Case." The patient was admitted to the Maternity Hospital with albuminuria and dropsy. She had a sudden rise of temperature, which remained high and fluctuating. Delivery was followed by death twenty-four hours later. The autopsy revealed septic endocarditis. Sir Halliday concluded by a reference to the literature of the subject.

ANALYTICAL REPORTS.

ALYPIN.

(Bayer & Co., London.)

THE search for a substitute for cocain which, while possessing the anæsthethic properties of that drug, will not give rise to the dangerous symptoms of collapse so frequently associated with the use of cocain, has been in progress practically ever since cocain was first introduced, and several preparations have been placed on the market for which it was claimed that the conditions referred to had been fulfilled. Most of these appear to be less toxic than cocain, but, on the other hand, the anæsthetic effect has not been so good. One of the very latest of these is alypin, and, so far as it has been tested, chiefly in ophthalmic cases, it has given great satisfaction. A 2 per cent. solution will anæsthetise the cornea for ten minutes and in some cases for a longer period. A special advantage is the absence of mydriasis and of paralysis of the accommodation. There was never any of the opacity due to swelling of the epithelial cells of the cornea which occasionally occurs after the use of cocain. The chief advantage, however, is that no toxic symptoms have so far been noted. It is too early yet to say whether or not alypin is likely to replace cocain. It must be subjected to further trials before such a conclusion is justified.

EDINBURGH
MEDICAL JOURNAL.

EDITORIAL.

George Buchanan. THE influence of St. Andrews permeates the tangled story of Scotland, as a golden thread runs through the varied web of an ancient tapestry. In the maze of the fabric the lustrous lines are here and there hidden from view, but in other places they form part of the most brilliant figures; in the same way the grey old town by the northern sea appears from time to time to have passed from view, only to press forward again in some period of intellectual activity or political struggle. The source of the powerful impression St. Andrews has made is to be sought in the great men found amongst her citizens. It is no doubt true that the first impulse, raising it above the level of neighbouring towns, came from the Church, but after the spell of Rome had been broken, distinguished men still lent the lustre of their names to the city. Among the greatest of these men, George Buchanan must unhesitatingly be ranked, and it was therefore a pious duty on the part of the University to commemorate with fitting ceremonial the fourth centenary of his birth.

Born at Killearn, in the heart of the Buchanan country, in 1506, George Buchanan was but little in his own country after his student days in St. Andrews until his return from the Continent in 1561, the year after the official recognition of the Scottish Reformation. Although in no sense a theologian, he at once joined the newly established Protestant Church, and it is of interest that six years later he occupied the Moderator's Chair. From the first he was closely identified with the University of St. Andrews, and he was appointed Principal of St. Leonard's College in 1565. This is not the place to trace his history, but the facts may be recorded that the Privy Council appointed him, in 1570, tutor to King James the Sixth. In the same year he became Director of Chancery, and Keeper of the Privy Seal; in virtue of this latter office he had a seat in the Privy Council as well as in Parliament.

It is difficult at this distance of time to estimate the influence which Buchanan exerted upon his contemporaries, but it must be remembered that he was not only a scholar and a philosopher, he was also a politician and statesman. As a scholar, he was essentially a humanist, saturated with the joyous spirit of Hellenic literature. As a philosopher, his views were somewhat stoical. In the realm of politics his tendencies must have been in the direction of compromise, or he would certainly not have been found acting along with Knox. As a statesman, Buchanan had views far in advance of his time. He attempted to instil into the mind of his Royal pupil the great truth that the source of power lay with the people, and that the Divine Right of Kings was only true when not misused. It is to be remembered that in addition to all his varied activities Buchanan was an admirable poet, and that he performed the duties of Court Poet, celebrating the various events in the Royal house with Latin masques.

At the great Meeting, which took place on 6th July, to which pilgrims from far and near wended their way, Lord Reay pronounced an interesting panegyric. He quoted Sir James Melville, in saying that Buchanan was " of good religion for a poet." There can be no doubt that he joined in the rebellion against scholasticism, and that his mind was soaked in the literature of ancient Greece and Rome, which he adapted to the problems of his own day. In his outlook upon the Reformers, he regarded them as champions of liberty, and Protestantism appeared to him little but a struggle for freedom. Thoroughly in earnest himself, he was able to make allowance for the errors of others.

It was indeed unfortunate, even deplorable, that his influence over his Royal pupil was so slight. Had he been able to mould the mind of the youthful Sovereign in accordance with his own principles, the history of the Stuart family, nay, of these Islands, and even of modern civilisation, would have been different.

Nothing could have been more appropriate than that this brilliant commemoration of the quatercentenary of the great poet, humanist, and historian should have taken place in connection with the oldest University of Scotland, with which Buchanan was connected, first as a student and afterwards as a Principal. To the ancient University it was gratifying to find so many distinguished men coming from distant parts to take part in the ceremony, and thus to show their admiration for the great scholar of the sixteenth century.

Disintegration of the Personality.

PSYCHOLOGY has travelled far since the days of Locke. For the groups of faculties into which he parcelled out the human understanding, the modern psychologist has substituted interwoven strata of memories, feelings, perceptions. He has discovered subconsciousness, but has not yet solved the riddle whether it is a lumber-room for memories which have served their time, a cabinet in which they are pigeon-holed, or, as Myers hoped, the link which binds mortal man to immortality. This we know,—a mental storm may disintegrate these strata, and many phenomena of hypnosis and hysteria can be explained on the assumption of such a dissociation. Dr. Prince[1] has analysed one of these disintegrations, and, stranger still, blended it again.

Disregarding for the nonce the numerous personalities of that unhappy lady, except to collate from their vagaries the symptoms which the flesh and blood Miss Beauchamp would have presented to the gross, material doctor, we might relate her case in this way: "Miss Beauchamp was a lady of neurotic heredity and antecedents. In 1893, as a sequel to mental shock in connection with a love affair, her disposition altered, she became morbidly conscientious, neurasthenic, and hysterical. After a course of hypnotism, she became subject to trance or somnambulism, and in this condition her actions were unseemly and contrary to her natural habits. She used, for example, to address to herself abusive letters, and parcels of spiders and frogs, of which she professed abhorrence; to smoke cigarettes (which made her sick), and thereafter to burn herself with their lighted ends; to write letters to the admirer with whom she had avowedly broken, making engagements with him which she immediately repudiated. Studious by fits, she was equally zealous in destroying laboriously prepared exercises: she was once found enwrapped like a cocoon in worsted from a piece of knitting on which she had expended much pains. She sewed up the sleeves of her frocks, piled her bed with her furniture, and then retired to sleep on the hearth-rug. She surreptitiously buried manuscripts along with other treasures, and grumbled about the theft of jewellery which she had secreted about her person. Her memory was very capricious; at times she had amnesia for all that had happened during the previous six years, while at other times she professed to remember the minutest details of her infancy. Sometimes she complained bitterly of having passed days in a trance; yet in a few moments she would describe with gusto her doings during the trance period. She was untruthful or morbidly scrupulous, reticent or effusive, childish or scholarly, frivolous or devout by turns; transient dementia supervened, and again delirium, with intervals of sanity when food or medicine was due. She lamented that she was 'possessed,' yet joyfully planned new devilry. Besides these psychical phenomena she presented the usual stigmata of hysteria, such as automatism, functional deafness and blindness, restricted fields, hallucinations, aboulia, and suggestibility. She was clairvoyant, and an expert crystal-gazer; at one time she experienced religious ecstasy and underwent sudden conversion."

The diagnosis would be "a poor, hysterical girl," and it would be pardonable were the doctor to dwell on the advances which science had made, for, not two centuries ago, Fife fisher-folk, their minister looking on approvingly, did to death witches on the testimony of just such a patient; while in lower stages of culture it is but the turn of a lottery whether she, bewitched, has her devil exorcised at the stake, or finds a vicarious sacrifice in some hapless possessor of the evil eye.

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[1] "The Dissociation of a Personality," London, 1906.

Dr. Prince, however, by ingenious research, throws another light on Miss Beauchamp's psychology. Her eccentricities and lapses of memory were due to alternating states of consciousness, each with its special chain of memories and character differing from and ignorant of the others—in a word, alien personalities housed in the same body. Miss Beauchamp as he first met her (B1) was a morbidly conscientious neurasthenic student, who knew of her trance actions only by their dire results, and mourned that she was as one possessed. During her trances she behaved either as a freakish immature child, calling itself Sally and referring to Miss Beauchamp in the third person, or as a strong-minded lady (B4), whose mental and moral equipment, and tastes as regards dress, food, and alcohol, were the antithesis of those of B1. The B4 train of memories coincided with those of Miss Beauchamp up to the time of the mental shock, and then lapsed for six years. This personality, therefore, was as ignorant of the neurasthenic B1 and her life, as the neurasthenic was of her. Neither B1 nor B4 knew anything, except by inference, of Sally, who was Miss Beauchamp's dissociated subconsciousness. This chain of subliminal memories is most curious. As Sally, Miss Beauchamp recalled every trumpery detail of life right back into infancy. As Sally, Miss Beauchamp had only a rudimentary education, and had lost her book knowledge. As Sally, she remembered her thoughts and life in the B1 stage, and all about the actions but *not* the thoughts of the B4 state. As Sally, her frivolous side came uppermost; she despised the bookish B1 as "the Saint," and the amnesic B4 as "the Idiot,"—and played elaborate practical jokes on both. Sally the subconscious, moreover, not only alternated, but coexisted with the other states, manifesting herself during the B4 and B1 phases by aboulia, obsessions, automatic writing, etc. The facts are bald compared to the dramatic narrative of the dances Sally led Miss Beauchamp, of the "hazings," of the scrapes: these read like a sensational novel. Imagine the possessor of such a trinity, each member of which leaps on and off the stage with the rapidity of a quick-change artist, and imagine, if you can, the hunt for the real Miss Beauchamp. Space forbids that we tell of the search: it is but justice to say that she *was* found, though her synthesis involved the psychical murder of B1 and B4, and the ruthless suppression of the fascinating Sally.

Tyranny and Insanity.

As an instance of the new philosophy practised by our lay friends, one has only to read a recent leader which appeared in the columns of a London daily, whose main *motif* seems to be to prove that all that the British people do is wrong, and all that its enemies do is right. This precious organ of the new enlightenment has now laid down the dictum that the supposed great increase of insanity in Ireland is due only to the persistent and ever-increasing tyranny practised by the people of England and Scotland upon the Irish tenant. How the intelligent Irishman must have chuckled when he read this magnificent deliverance. We are not of any party, and it is not our function to enter into any analysis of Irish history. It has supplied many a tragic tale, it is not free from the grossest injustice, but to assert that the Irish people have been driven into dementia, mania, and melancholia by political instruments is to make a laughing-stock of the question. Any one who is intimate with Irish social conditions will tell you that the same forces which tend to insanity are there as in the rest of the British Isles, though in a sense exaggerated, but quite independent of any legislation, of what the extreme Nationalist calls "an alien people." Intermarriage, drink, and laziness grafted on to the Celtic temperament must in the long run tell their story. The Irish peasant is a man of great wit and charming personality, but he is neither provident, over-temperate, nor wise in the selection of his bedmate, and where such conditions exist in a race which is notoriously liable to emotional excitement and depressions, there can only be one sequel. Even as it is, the picture as painted by the journal in question is overdrawn, as are all pictures which deal with the subject of insanity. True, insanity is on the increase everywhere, but, taking into account the special conditions we have mentioned, there is no reason to suspect that we can reasonably put forward an historical plea as a part of the etiology of the case. And, so far as we can tell, there is no analogy to be found for such a contention in the whole history of the world, for the Irish is not the only downtrodden of peoples.

Women as Infirmary Residents.

The decision of the Managers of the Infirmary not to appoint women graduates as residents in the wards devoted to the teaching of women is based upon the impossibility of providing them with the necessary accommodation. The decision is most unwelcome to those who are interested in the Medical Education of Women, but to them only. We need not repeat the arguments why a woman is unsuited to act as house surgeon in a ward devoted to the treatment of patients belonging to the opposite sex, but we are prepared to go a step further and revise the whole question of devoting a medical and a surgical charge in the Infirmary to the teaching of women. The overcrowding of the wards available for male students and the menacing difficulty of providing them with the necessary facilities for instruction in clinical medicine and clinical surgery, is the most serious problem confronting those concerned with the administration of the Edinburgh Medical School; and if it be the case, as the Managers of the Infirmary allege, that it is impossible to provide accommodation for another surgical clinique for male students, the logical solution of the problem would consist in the transference of the women to some other hospital.

Dr. Mackenzie Johnstone. We have learned with sincere regret that Dr. Mackenzie Johnstone has resigned the appointment of Surgeon for Diseases of the Throat, Ear, and Nose to the Royal Infirmary. Since he succeeded to the charge of the wards in this department Dr. Johnstone has suffered from an affection of the voice, which has rendered his duties as a clinical teacher laborious in the extreme, and he has felt it to be his duty to resign. Everyone who is interested in the Infirmary and in the Medical School will regret the loss of the services of one who was generally regarded as one of the ablest of its surgeons and most devoted of its clinical teachers.

The Portrait of Sir Henry Littlejohn. It is hoped that Sir George Reid will undertake the portrait of Sir Henry Littlejohn. We have been asked to intimate that intending subscribers will greatly facilitate the work of the Committee by forwarding their subscriptions to Mr. Ramsay, Royal Bank of Scotland, Forrest Road, Edinburgh.

Emeritus Professor A. R. Simpson's long and valued services as a teacher in the Edinburgh Medical School have received the recognition which they deserve, in the bestowal of the honour of knighthood at the hands of His Majesty the King. We tender our hearty congratulations to Sir Alexander and to the University of which he was so distinguished a senator.

The July number of the *Canadian Journal of Medicine and Surgery* is practically devoted to the coming meeting of the British Medical Association.

It contains a large number of beautiful illustrations of Toronto, and also gives a great deal of useful information, more especially in regard to the numerous excursions which have been arranged.

We recommend its perusal to all intending visitors, as they will thus be enabled to arrange their plans more definitely, and with a precise idea as to the facilities afforded and cost involved.

ORIGINAL COMMUNICATIONS.

THE FORMATION AND ACTION OF SALICYLURIC ACID IN THE HUMAN BODY.[1]

By RALPH STOCKMAN, M.D., *Professor of Materia Medica in the University of Glasgow.*

IN 1856, Bertagnini found that salicylic acid taken by the mouth appears in the urine partly unchanged and partly as salicyluric acid, the latter being a combination with glycocoll (amido-acetic acid) having the formula $C_9H_9NO_3$. Subsequent researches have fully confirmed this, and have shown that no salicylic acid is excreted in the fæces, and that little or none is broken up in the body. It is all absorbed from the small intestine, and nearly the whole of it reappears in the urine, the amounts excreted by other channels being very small. As regards the relative quantities of the two acids, Beck states that in the urine of hospital patients who were taking large doses of salicylic acid he found approximately 1 grm. salicylic to each $\frac{1}{2}$ grm. salicyluric acid, but his methods were not very exact. U. Mosso, using a more detailed process, got on three occasions from his own urine after taking sodium salicylate, approximately $\frac{1}{6}$, $\frac{1}{9}$, and $\frac{1}{11}$ as salicylic acid, and approximately $\frac{5}{6}$, $\frac{8}{9}$, and $\frac{10}{11}$ as salicyluric acid. In a dog, after giving 4 grms. by the mouth, he recovered from the urine 2·775 grms. salicylic and 1·852 grm. salicyluric acid. On five occasions I separated the total salicylic and salicyluric acids from the twenty-four hours' urine of patients who were getting ordinary doses of sodium salicylate, and determined how much was present unchanged and how much in combination with glycocoll. As unaltered salicylic acid I obtained $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{8}$, $\frac{1}{20}$, and a mere trace, of the total salicylic acid present, the remainder being in combination with glycocoll as salicyluric acid.

The method used was to evaporate the urine almost to dryness, thoroughly mix with strong hydrochloric acid to set free the salicylic and salicyluric acids which are present as alkaline salts, mix with fine sand, and percolate with ether and acetic ether until the acids were thoroughly extracted. On evaporating the ether the residue is a dark yellow syrup. This was dissolved in boiling water, heated with animal charcoal, filtered hot, and evaporated to dryness. The salicylic acid can be dissolved out by boiling benzol, in which it is very soluble, leaving behind the salicyluric acid. The salicylic acid so obtained is almost colourless, and is crystalline. The salicyluric acid may be obtained also practically pure by dissolving in boiling water and crystallising out. If the various operations are carefully carried out the loss is very trifling.

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[1] This forms part of a research towards the expenses of which a grant was made by the Carnegie Trustees.

Salicyluric acid so obtained is in fine crystals, has a slightly bitterish taste with no trace of sweetness, is almost insoluble in hot benzol, and is much less soluble in ether than salicylic acid. Its solubilities in water, alcohol, and chloroform do not differ much from those of salicylic acid, and it gives the same violet and green reactions with solutions of ferric chloride and copper sulphate.

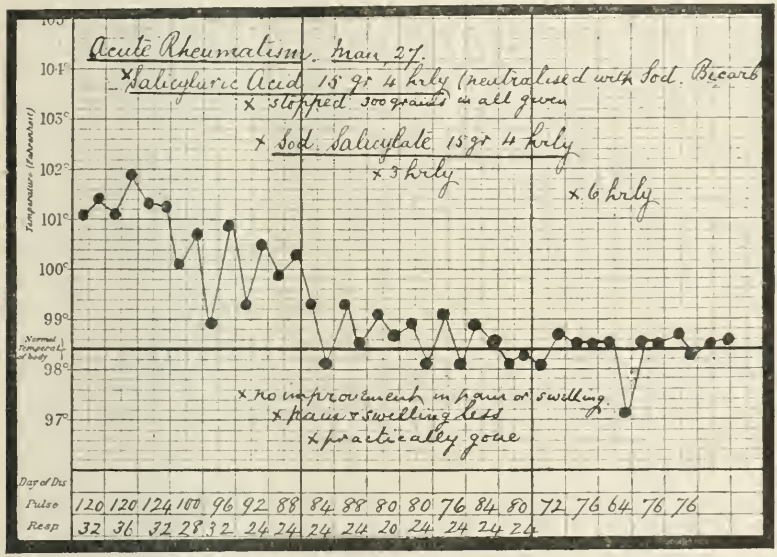
I have never found either acid in the saliva, and only occasionally have been able to detect minute traces in the sweat. On adding ferric chloride a violet colour is readily obtained from joint fluid, the serum of blisters, bronchial mucus, and pleural effusions, in persons who are taking sodium salicylate in ordinary doses. This reaction is more readily obtained if the fluid is heated with a little dilute hydrochloric acid, extracted with chloroform and the chloroform evaporated. Traces both of salicylic and salicyluric acid seem to be present, but owing to the total quantity being so minute it is difficult to be quite certain on this point. My own results, as well as Mosso's, show therefore that when salicylate of sodium or salicylic acid is taken by the mouth, the greater part of it is excreted in the urine as salicyluric acid. The amount varies greatly, however, sometimes as much as one-half and sometimes only a mere trace escaping synthesis with glycocoll, but generally the salicyluric is much in excess of the salicylic acid.

From the urine of patients who were taking sodium salicylate I separated out a considerable quantity of salicyluric acid, purified it carefully, and investigated its pharmacological and therapeutical action. It is well known that substances like phenol, camphor, and benzoic acid combine in the body with sulphuric acid, glycuronic acid, and glycocoll, and that the new bodies thus formed are less poisonous than the original substances, and are excreted in the urine. Salicylic acid is no exception to this rule, as its compound with glycocoll, salicyluric acid, was found to be almost inactive.

A 1 in 2000 solution of salicylic acid in water completely prevents the fermentative action of yeast on sugar, but 1 in 500 solution of salicyluric acid merely hindered fermentation for some hours, after which it went on freely. A solution of 1 in 1000 had no visible action.

Two experiments were made on rabbits. To one animal 2 grms. salicyluric acid neutralised with sodium hydrate was given hypodermically, and to another 4 grms. similarly neutralised. Neither of the animals showed the slightest symptom of any pharmacological action. This is in strong contrast to the effects of salicylic acid, as, in rabbits of the same weight, 1·4 grm. and 2 grms. given hypodermically as the sodium salt proved fatal in a few hours. Salicyluric acid was recovered unchanged from the urine of the rabbits to which it was given subcutaneously.

It is of practical importance to know whether salicyluric acid has any action in acute rheumatism, as a large part of the salicylic acid taken is converted into it at once, and may thus lose its specific anti-rheumatic effect. On the other hand, the new compound might have proved even more powerful than salicylic acid. The question was readily settled by administering 15 grs. salicyluric acid (neutralised with sodium bicarbonate) every four hours in a case of acute rheumatism. Three hundred grains in all were given without any appreciable effect, whereas sodium salicylate in 15-gr. doses four-hourly checked the symptoms, and when increased to three-hourly doses caused them rapidly to disappear. The accompanying chart shows this very clearly.



The necessity, therefore, of giving frequent and large doses of sodium salicylate in acute rheumatism is determined not only by its rapid excretion from the body, but also by its rapid conversion into the inert salicyluric acid.

No experiments have been made to determine where the salicylic acid combines with glycocoll in the body to form salicyluric acid, but Bunge and Schmiedeberg have shown that in the case of the closely allied body benzoic acid, the synthesis with glycocoll to form the inert hippuric acid takes place in the kidney, and later researches have proved that the synthesis is due to a ferment, and occurs in various tissues.

Methyl salicylate, in 10 to 20 minim doses, or applied locally and through the skin, is extremely active in acute rheumatism.

The urine gives a purple colour on the addition of ferric chloride solution. According to Baumann and Herter, the salicylic acid is excreted in combination with sulphuric acid and not with glycocoll. I have made no observations on the point, but if they are correct in their statement it is almost certain that the ethereal sulphate formed in the body has little or no action.

SALIGENIN ($C_6H_4.OH.CH_2OH$) is chemically the alcohol of salicylic acid ($C_6H_4.OH.COOH$), and from it salicylic acid is readily formed in the body and appears in the urine as salicyluric acid. Saligenin in 15-gr. doses six times daily is a fairly efficient anti-rheumatic, its action no doubt depending on the salicylic acid formed from it in the body, for the substance itself even in saturated solution has no restraining effect on yeast fermentation or on the growth of bacteria. On examining the urine of persons taking saligenin by the mouth, I found only salicyluric acid, no salicylic acid and no saligenin being present. Its conversion into the inert salicyluric acid is therefore very rapid and complete.

SALICIN is the glucoside of saligenin. It readily splits up in the body, and ultimately salicylic and salicyluric acids are formed in the urine. I never found any unchanged salicin. Like saligenin, salicin in saturated solution has no effect on yeast fermentation, nor on bacterial growth. Its anti-rheumatic action is no doubt due to the fact that salicylic acid is readily formed from it in the body.

OBSERVATIONS ON PERFORATED GASTRIC AND DUODENAL ULCER, BASED ON A PERSONAL EXPERIENCE OF FORTY-SIX CASES OPERATED UPON.[1]

By ALEXANDER MILES, M.D., F.R.C.S.Ed., *Assistant-Surgeon, Royal Infirmary, Edinburgh; Surgeon to Leith Hospital.*

THESE observations are based upon an experience of thirty-six cases of ulcer of the stomach, and ten cases of duodenal ulcer, on which I have had occasion to operate during the last few years on account of perforation or its immediate effects.

It is not necessary here to consider the general subject of gastric and duodenal ulceration, which for the most part lies within the domain of medicine rather than of surgery, although I need not remind this Society that these conditions no longer interest the physician alone. Discussions which have taken place within these walls have played no inconsiderable part in directing attention to the possibilities for good of surgical intervention in a limited, yet clearly defined, class of cases. If there is still room for discussion as to the precise rôle of surgery in the treatment of unperforated ulcers, there is, I think, no difference of opinion regarding its place when perforation has occurred. Attention will therefore be confined to the subject of perforated ulcers, chiefly in its clinical aspects, and to avoid confusion I shall refer to gastric and to duodenal perforations separately.

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[1] Paper read before the Medico-Chirurgical Society of Edinburgh, July 4, 1906.

Sex Incidence of Perforation.—There is, I think, a general impression that not only does gastric ulcer occur with greater frequency in women than in men,—the ratio, according to F. Brunner (2), who has analysed all the statistics published up to 1903, being as four women to one man,—but that in the female there is a greater liability for the ulcers to perforate. It is undoubtedly true that women suffer from perforation oftener than men, but published statistics show that they do so only in so far as they are more frequently the subjects of ulcer.

My own series of cases—too small to justify any general conclusion—would seem to indicate that the liability to perforation is even greater in the male than in the female, for of thirty-six gastric cases operated upon, twenty-five were women and eleven men—a proportion roughly of 2 to 1. If I include my cases of duodenal ulcer, there are twenty males to twenty-six females (Table I.). It would thus appear that men present symptoms of perforation almost as often as women, a fact which has a practical bearing on diagnosis, as there is a tendency to consider that the presumption is against a diagnosis of perforation of the stomach or duodenum when the patient is a male.

Age.—The youngest patient on whom I have operated for perforated *gastric* ulcer was a girl æt. 15½; and the oldest a woman æt. 55½. From the accompanying table (Table I.) it will be seen that perforation of gastric ulcers occurred twenty-two times in patients below the age of 30, and fourteen times in patients over that age. It will also be observed that below the age of 30 only three were males (nineteen females to three males), while above 30 the males predominate (eight males to six females).

So far as I have been able to find, the youngest patient hitherto operated upon for perforation of a gastric ulcer was a boy æt. 12, successfully operated upon by Mr. Caird (4). The oldest patient of whom I can find a record was a man æt. 71, also operated on by Mr. Caird, in 1905. The oldest patient who recovered was a man æt. 62, operated upon by T. Myles of Dublin (5) in 1899. In this case the perforation occurred during the reduction of an umbilical hernia, and it is an interesting fact that Mr. Caird's aged patient also suffered from umbilical hernia.

The age in the *duodenal* cases ranges from 19 to 64; the only female in the series was 21 years of age.

While in itself the age of the patient is not a factor of great importance in prognosis, it is interesting to observe that, in the *gastric* series, of fourteen patients over 30 years of age only four survived (Geo. O., æt. 31; Wm. L., æt. 34; Mrs. K., æt. 36; and

Mrs. W., æt. 55½). Of the twenty-two patients under 30, fifteen recovered.

In the *duodenal* series, of the five patients who recovered, four were under the age of 40, and one was 52: and of the five who died, four were over 40, and one was 19 years of age.

Table I.—*Age and Sex.*

A. Perforated Gastric Ulcers—36.

Age.	Females.	Males.	Total.
Between 15 and 20	10	2	12
,, 20 ,, 30	9	1	10
,, 30 ,, 40	4	5	9
,, 40 ,, 50	0	3	3
,, 50 ,, 60	2	0	2
	25	11	36

B. Perforated Duodenal Ulcers—10.

Between 15 and 20	0	1	1
,, 20 ,, 30	1	1	2
,, 30 ,, 40	0	2	2
,, 40 ,, 50	0	2	2
,, 50 ,, 60	0	2	2
Over 60	0	1	1
	1	9	10

It would appear, therefore, that, other things being equal, the younger the subject the greater is the prospect of recovery.

Occupation.—There does not appear to be any traceable relationship between the occupation of the patient and the occurrence of perforation. All the patients led busy, active lives, the majority, however, being engaged indoors. In the *gastric* series, of the females eight were domestic servants, two shopgirls, six housewives, one matron of a charitable institution, one a hospital nurse, one a tailoress, one a clerkess, three factory workers, one an upholstress, and one an outdoor worker. The males included an insurance agent, a clerk, a baker, a vanman, and five labourers.

In the *duodenal* series, the female was a shopgirl, and the males included a teacher of mathematics, a cashier, a county sanitary inspector, a dispensing chemist, a grocer, a barman, two joiners, and a labourer.

Previous History of Dyspepsia or of Ulcer.—*Gastric cases.*

—The great majority of my patients gave a history of having suffered for a longer or shorter period from indigestion, although in a considerable proportion the symptoms had not been sufficiently severe to lead them to seek medical advice. One patient, for example, an insurance agent, æt. 38, had been troubled for some years with gastric discomfort and griping pains after taking food, but although he suffered a good deal, he had never consulted his doctor about the condition. There was no history of vomiting, hæmatemesis, or melæna. Perforation occurred one Saturday afternoon on the top of a tramway car while he was returning from a game of golf.

In other cases the patients had been specially treated for dyspepsia, and in some were actually under treatment when the perforation occurred.

This was so in the case of a hospital nurse, æt. 25, who for about three years had complained of a feeling of distension and some pain after food, so that she had to be very particular about her diet. There was no vomiting or melæna, or other symptom suggestive of gastric ulcer. Perforation occurred while she was engaged in decorating her ward for Christmas.

A. B. Mitchell (^{16}) has met with two cases of perforation occurring in patients who were undergoing a course of treatment by rectal feeding.

In the *duodenal* cases, on the whole, the history of antecedent dyspepsia was more constant and more definite—a circumstance which may partly be explained by the fact that the patients were males. A history of discomfort or pain to the right of the umbilicus an hour and a half or two hours after food, of inability to take certain articles of diet, and of sickness, was not uncommon. One patient had vomited blood a year before perforation occurred, another had passed dark stools, and one had for some months been treated for dilated stomach by lavage, and had actually washed out his stomach as usual the night before perforation occurred.

In some of the *gastric* cases the patients had been free of symptoms of dyspepsia for a considerable period prior to the occurrence of perforation.

This was the case, for example, in a clerkess, æt. 24, who for some years had suffered a great deal from indigestion, but after a course of treatment and careful dieting had been apparently cured, and was for some months entirely free of discomfort, and able to take ordinary diet with impunity. Perforation occurred one evening while she was walking home from business.

A married woman, æt. 36, also had enjoyed five years' complete immunity from symptoms of dyspepsia before perforation occurred.

Schloffer (^{6}) and Guinard (^{7}) have reported similar cases.

In one of my *duodenal* patients also this improvement in general health was very striking.

He was a gentleman, æt. 50, who for years had suffered greatly from indigestion. For some months he had been less troubled, and after a prolonged holiday had returned to business feeling better than he had done for years, and able to take ordinary diet without discomfort. Without warning, perforation occurred one night while he was in bed.

In a considerable number of cases the antecedent symptoms described were clearly those of ulcer of the stomach. With regard to the presence of a definite history of gastric ulcer, a striking difference between the sexes is manifest in my statistics, because, while in only one man out of eleven was there a history suggestive of ulceration, in twelve out of twenty-five women the patients had either been treated for ulcer or the symptoms clearly pointed to the existence of such a condition. It is not improbable that previous evidence of ulcer is even more common than these figures would appear to indicate, as in several of the negative cases the patients when seen were too ill to bear cross-examination on such points, and the friends were often not in a position to give any information.

Only in five *gastric* cases—two men and three women—and two *duodenal* cases—one man and one woman—was there no history of previous gastric disturbance, the patients having taken ordinary diet without pain or discomfort, and apparently been in perfect health up to the moment of perforation. Pariser (1), Schuchardt (1), Cornil (1), Bourlot (1), Caird (4), and others have recorded similar cases.

These observations agree in the main with those of Mayo Robson (8), who estimates that symptoms of ulcer may be latent in about 20 per cent. of cases and only slight in others, but that in fully 50 per cent. there are marked symptoms. F. Brunner (2), from an analysis of 286 recorded cases of perforation, indicates that only 4½ per cent. occur in patients apparently healthy, as against about 90 per cent. with a previous history suggestive of ulceration. Weir and Foote (9) calculate that in 92 per cent. there is an antecedent history of ulcer.

It is a curious fact that while a previous history of severe dyspepsia, and even of ulceration, is so very frequent, only in five gastric and two duodenal cases was it definitely stated that the patient had at any time vomited blood. This absence of hæmatemesis from among the antecedent symptoms has also been observed by Mr. Caird.

PREMONITORY SIGNS OF PERFORATION.—*Gastric cases.*—It may be worthy of note that in a number of cases the symptoms of indigestion had become more pronounced for some time before the occurrence of perforation.

For example, the nurse already referred to, who was a chronic dyspeptic, two days before perforation occurred, had to go off duty and spend the day in bed on account of a severe attack of "indigestion," associated with pain in her left side. Next day she felt better and resumed her work, but the following day the ulcer perforated.

Another patient, an anæmic girl (Cath. F.), æt. 18, four days before perforation occurred, had to go to bed for a day on account of unusually severe pain in the epigastrium after taking food. In a couple of days this had passed off, and she resumed her usual mode of living until perforation took place.

In the case of another girl (Susan F.), æt. 20, who had been under treatment for dyspepsia for three months, for several days before her ulcer perforated the pain had become much worse, and the day before, she had, for the first time, vomited a quantity of dark brown coffee-ground material.

Another girl (Euph. L.), æt. 20, who had long suffered from indigestion, fourteen days before perforation took place, had an attack of what was diagnosed and treated as "acute gastritis," and during this attack she also, for the first time, vomited blood.

A man (Danl. B.), æt. 36, who had suffered from indigestion for years, also had an aggravation of all his symptoms about a fortnight before his ulcer perforated ; and in another man (Wm. O.), æt. 49, with a history of indigestion of three months' duration, there was a similar aggravation prior to the occurrence of perforation.

Duodenal cases.—In several of my duodenal cases also there were premonitory signs.

My only female patient, æt. 21, a week before perforation occurred, had to go to bed for two days on account of sharp pain in her right side, but with no signs of gastric disturbance. She resumed her work, and some days later perforation occurred while she was engaged in her shop. A lad, æt. 19, felt ill with pain in his side the day before perforation occurred, but was able to go to work next morning. During the forenoon perforation occurred while he was working at his bench as a joiner. Two men had had no motion of the bowels for a week before perforation occurred.

POSSIBLE FACTORS DETERMINING PERFORATION.—I have carefully analysed the records of my cases to try to find some explanation of the final perforation of the ulcer into the peritoneal cavity, but I fear without any success. An inquiry regarding what the patient was doing when the symptoms indicative of perforation came on, for example, fails to reveal any constant factor which would account for the ulcer giving way. In the *gastric* cases in which this point was noted, I find that—

5 were in bed,
4 were sitting by the fire,
3 were at table,
1 was sitting on a tramcar,
1 was driving on a baker's van,
1 was travelling in a train.
—
15

1 was stepping out of a train,
1 was walking upstairs,
7 were walking on the street.

—

9

1 was doing light house work,
1 was working in a factory,
1 was doing labourer's work,
1 was doing up her back hair,
1 was hanging clothes on a rope,
1 was decorating a Christmas tree.

—

6

The first fifteen, therefore, were practically at rest, the next nine were making some slight effort, and only the remaining six were engaged in such a way as to involve any muscular strain or stretching of the body.

In the *duodenal* cases, two of the patients were in bed when perforation took place, but one stated that he was turning round quickly when he was suddenly seized with intense pain, and he was definite in attributing its onset to his having overstretched himself. Two were sitting by the fire: three were at work as shopkeepers, but one of them was reaching to take a box off a high shelf when the pain came on; one was at work as a joiner, and one as a labourer. Only in the two cases mentioned was the patient aware of making any movement likely to stretch the body at the moment when the symptoms of perforation began, and in both of these the perforation was small and rounded, in no way suggestive of a tear.

Nor does a consideration of what the patient was doing when perforation occurred, viewed in relation to the size and shape of the aperture in the stomach, throw any clearer light on the point. It is true that in the case of the nurse who was engaged in decorating a Christmas tree, the perforation took the form of a longitudinal tear about five-eighths of an inch long in the base of the ulcer, and it is conceivable that this might be explained by stretching of the stomach in overreaching herself, but a precisely similar condition was found in a girl (Euph. L.) who was walking on the street when her acute symptoms began. Further, in other patients who were similarly stretching themselves, in hanging out clothes and in dressing the hair, for example, the perforation took the form of a small, clean-cut aperture.

In this connection the case of a clerkess (B. H.), æt. 24, may be cited.

She stated that, fourteen days before the onset of her acute symptoms, while lifting a heavy roll of linoleum, she felt a sharp pain just below the left costal margin, and that "an uneasy feeling" had persisted in this region, although in other respects she was perfectly well. At the operation we found a long, narrow tag of omentum firmly adherent to the upper edge of the indurated area of the stomach wall, and just above the perforation. The position of the ulcer corresponded to the site of the sharp pain she had experienced a fortnight before, and it is possible that the pain which occurred while she was straining to lift the weight, was due to traction exerted through this tag of omentum. This explanation of the pain is, of course, not reconcilable with Lennander's proposition that the wall of the stomach, the visceral peritoneum, and the omentum are alike insensitive to pain. If we accept Lennander's statements in their entirety, however, it is difficult to account for many of the painful manifestations of gastric and other abdominal conditions.

Another explanation of this case suggests itself, however, namely, that the muscular effort caused a slight tear in the ulcer, and that the omentum had become adherent over the spot, and so prevented leakage.

About two years ago, I saw, with Dr. James Mill, a patient, æt. 31, who had for some time previously suffered from symptoms of duodenal ulcer. Two days before I saw him, while helping to lift a heavy box, he was noticed to become "deadly white," and he looked so ill that his fellow-workmen sent for brandy, and gave it to him. He had not been conscious of anything giving way at the moment, but a short time afterwards he was seized with intense pain in the pit of the stomach, doubling him up and causing him to cry out. On reaching his home, he was in a state of profound shock, with a markedly sub-normal temperature, and a pulse of 45. There was pain all over the abdomen, and an area of great tenderness to the right of the epigastrium. He passed a very bad night, but next morning began to improve, and as the improvement was maintained he was not operated upon. The opinion we formed was that the muscular strain had determined rupture of a duodenal ulcer, which had set up a localised peritonitis. In the course of a few weeks he recovered completely.

Cases have been recorded in which perforation has occurred from such direct forms of traumatism as a blow on the side, a fall down a stair, and the attempt to reduce an umbilical hernia; also from muscular efforts, such as lifting a heavy weight, and during attacks of coughing or vomiting; but it is remarkable how seldom, on the whole, any traumatic factor seems to come into play in determining perforation.

It might be expected that the ingestion of food should play a part in determining perforation, but my observations do not appear to bear this out. In the twenty-eight *gastric* cases in which the time of the last meal is noted, I find that perforation occurred—

in 3—while taking a meal,
,, 2—immediately after a meal,
,, 3—1 hour ,, ,,
,, 5—2 hours ,, ,,

in 4—3½ hours after a meal.
,, 4—4½ ,, ,, ,,
,, 5—5½ ,, ,, ,,
,, 1—6 ,, ,, ,,
,, 1—8 ,, ,, ,,

In eight, therefore, the stomach was presumably full; in thirteen, it probably still contained some food; and in seven it was presumably empty. In the majority of the cases in which the stomach was presumably full when perforation occurred, the patients were making no muscular effort at the moment, as most of them were either sitting at table or by the fire, or were in bed at the time. The condition of the stomach with regard to food, therefore, does not appear to have any important bearing on the occurrence of perforation.

In this connection, however, I should refer to a case in which a girl, æt. 16, who had never previously complained of any gastric disturbance, was suddenly seized with symptoms of perforation immediately after she had eaten a large quantity of raw oatmeal, and then swallowed a jugful of cold water. On opening the abdomen, a small circular perforation was found in the centre of an indurated ulcer about the size of a shilling.

In the *duodenal* cases in which this point was noted, perforation occurred—

in 1—while taking a meal,
,, 1—1½ hours after a meal,
,, 3—2 ,, ,, ,,
,, 1—4 ,, ,, ,,
,, 2—5 ,, ,, ,,
,, 1—8½ ,, ,, ,,

From these facts no conclusions can be drawn.

Morbid Anatomy.—*Gastric cases.*—It is generally recognised that while ulcers occur with greatest frequency on the posterior wall of the stomach, the majority of those which end in perforation are situated on the anterior wall. This has been variously attributed to the greater mobility of the anterior wall, to the fact that it is less liable to form adhesions with adjacent structures, and to its greater exposure to traumatism.

F. Brunner (2) has collected the records of 320 cases of perforation, and of these 278 were on the anterior wall, and only forty-two on the posterior—in other words, perforations on the anterior wall are about six and a half times more common than on the posterior.

In my own series, thirty-three of the ulcers had perforated on the anterior wall and only three on the posterior—anterior perforations therefore being eleven times more frequent than posterior.

TABLE II.—*Site.*

A. PERFORATED GASTRIC ULCERS.

	Anterior Wall.	Posterior Wall.	Total.
Author's cases . .	33	3 (1 in 11)	36
F. Brunner's collected cases	278	42 (1 in 6·6)	320

	Cardiac End.	Body of Stomach.	Pyloric End.	Total.
Anterior Wall—				
Author's cases .	4	12	17	33
F. Brunner's collected cases .	122	23	78	278
Posterior Wall—				
Author's cases .	0	2	1	3
F. Brunner's collected cases .	14	10	7	42

B. PERFORATED DUODENAL ULCERS.
(*All in first part of duodenum.*)

	Anterior Wall.	Posterior Wall.	Total.
Author's cases . .	9	1	10

Brunner's statistics indicate that ulcers situated towards the cardiac end of the stomach more frequently perforate than those in the body of the organ or at the pyloric end. These are his figures: *Anterior wall.*—Cardiac end, 122; body of stomach, 23; pyloric end, 78. *Posterior wall.*—Cardiac end, 14; body, 10; pyloric end, 7.

In my experience the reverse has been the case, as these figures show: *Anterior wall.*—Cardiac end, 4; body of stomach, 12; pyloric end, 17. *Posterior wall.*—Cardiac end, 0; body of stomach, 2; pyloric end, 1.

All observers seem to agree that the vast majority of perforations are met with towards the lesser curvature of the stomach.

Duodenal cases.—In only one case of duodenal ulcer was the perforation on the posterior wall.

It was that of a man, æt. 50, who had suffered from dyspepsia for years and had also been addicted to alcohol. One of the anterior perforations was close to the upper edge of the bowel, and one close to the lower edge. In one case, operated on sixteen days after perforation for localised abscess, from the situation of the pus, the rupture was believed to have been on the anterior wall.

MULTIPLE PERFORATONS.—I have only once met with a case in which there was more than one perforating ulcer.

It was that of a girl (Susan F.), æt. 20, who was sent into Leith Hospital in June 1904 by Dr. William Paterson. She had suffered from anæmia and symptoms of gastric ulcer for about three months, and during the latter half of that time had been under treatment. Perforation occurred during the middle of the night while she was asleep, but the doctor was not sent for till late next forenoon. By the time she reached hospital she was *in extremis*, and some time was lost in obtaining the consent of the parents to operation. The abdomen was opened fifteen hours after perforation took place. An aperture, which was large enough to admit the tip of the index finger, was found in the anterior wall of the body of the stomach close to the lesser curvature. It occupied the centre of an ulcer about the size of a half-crown piece. The perforation was closed, the abdomen washed out, and the patient put back to bed. She died a few hours later, and after death it was found that there was a second ulcer on the corresponding part of the posterior wall which was just on the point of perforating.

This is by no means an isolated observation. Mikulicz (^{10}), Helferich (^{1}), Barling (^{11}), and others have reported similar cases. Demons (^{12}) and Stelzner (^{13}) have each sutured a perforation on the anterior wall, and at the autopsy found a second perforated ulcer on the posterior wall. Brunner has met with no fewer than 39 cases of multiple perforations in 120 autopsies.

SIZE OF ULCERS AND PERFORATIONS.—*Gastric cases.*—The ulcers I have met with have all been rounded or oval, and their size, as estimated by the area of induration in the stomach wall, has varied from that of a shilling to that of a crown piece. In some cases the thickening and induration were comparatively slight, in others they were so marked as to give to the area of stomach wall implicated almost a cartilaginous consistence. In one instance, the tissue surrounding the perforation was nearly three-quarters of an inch in thickness, and so dense that it was necessary to excise the whole ulcer before the aperture in the stomach could be closed.

In the great majority the perforation took the form of a small rounded or oval hole, with regular, clean-cut edges, as if a piece had been punched out of the centre of the ulcer. In most cases the opening just admitted the point of a pair of Kocher's artery forceps (2 mm.); in some it admitted the forceps up to the joint (8 mm.).

In five cases the perforation was so small that only the tip of a fine silver probe could be passed through it; while in four others the opening was as large as a threepenny piece, admitting the tip of the little finger. Two of these large perforations were on the posterior wall of the stomach, and in neither was the ulcer of large size, or particularly thick, and there were no adhesions related to it. Another was on the lesser curvature, and the ulcer involved both the anterior and posterior walls of the stomach. It may be remarked that each of the three perforations which I have met with on the posterior wall was larger than any of those occurring on the anterior wall.

It is interesting to note in passing, that while all the five patients with minute perforations recovered, the four with large perforations succumbed. In the duodenal cases, also, it was observed that recovery took place in all the cases in which the perforation was minute, while the larger perforation proved fatal.

In two cases, the perforation took the form of a longitudinal tear, five-eighths of an inch and three-quarters of an inch long respectively, and in each the ulcer was exceptionally thick and indurated. In one of these patients there was a distinct history that perforation followed during or soon after muscular effort, but in the other the patient was walking quietly on the street when the perforation occurred, and was not aware of having unduly exerted herself in any way.

In the *duodenal* cases the ulcers varied in size from about a quarter of an inch to one inch in diameter, in some cases being thick and indurated, in others comparatively thin and soft. Five of the perforations were minute, admitting only the end of a probe; four were larger, varying in diameter from an eighth to a quarter of an inch.

Relation to adhesions.—In the great majority of cases, both gastric and duodenal, there were no organised adhesions in the vicinity of the ulcer which had perforated.

In two cases of perforation of the anterior wall, a portion of omentum was firmly adherent to the stomach over the area occupied by the ulcer, and in each the patient had complained of sharp pain below the left costal margin for about two weeks before perforation occurred. It is possible that this pain was due to traction on the adherent omentum, and this view receives support from the fact that one of the patients volunteered the statement before operation, that the pain was at once relieved when she took off her corset and lay down in bed.

In other two cases there were adhesions between the liver and the lesser curvature of the stomach, and in one of these pain had been a prominent symptom for some time before perforation occurred.

In one case there was a long adhesion between the great omentum and the anterior abdominal wall, which shut off the upper segment of the peritoneal cavity across the greater part of the abdomen. At each side, however, there was an open channel, which permitted of the diffusion of fluid when perforation occurred.

(*To be continued.*)

THE MENTAL DISORDERS OF PREGNANCY AND THE PUERPERAL PERIOD.

By Nathan Raw, M.D., M.R.C.P. (Lond.), F.R.S., *Physician, Mill Road Infirmary, Liverpool, and Visiting Physician, Haydock Lodge Asylum.*

In relating my experience of the treatment of puerperal insanity, I can do little more than refer very briefly to the general characteristics of the condition and state my results. The subject is one covering such a wide clinical and pathological area as to preclude anything like a complete résumé of its varying and manifold symptoms.

During the last eighteen years of continuous asylum and hospital experience, I have met with over 300 cases of puerperal insanity. Unfortunately, in a large majority of these cases no detailed and careful notes were kept, so that for purposes of accurate scientific consideration they are of little value. I have, however, a more careful record of my last 102 cases, which I propose to make the basis of this paper. In estimating the results of my treatment in hospital, it must be borne in mind that I can only detain my patients for a certain statutory time under section 20 of the Lunacy Act, on the expiration of which time I must send the patients to the county asylum, so that I am not in a position to tell you exactly how many of these patients were discharged from the asylum recovered. It is a fact, however, that we were able to see such an amount of improvement in the mental condition of twenty-four patients out of 102 in the short period of three weeks, as to obviate the necessity of transfer to asylums, and to allow of their being treated to a conclusion in the hospital.

The following Table shows the number of cases treated and the number transferred to asylums.

Of the 102 cases tabulated, eight died directly from the effects of insanity, either from sheer exhaustion as the result of prolonged active mania, or from inanition with active melancholia. Beyond intense congestion of the brain and meninges and chronic kidney disease in four of the six cases, nothing was found post-mortem to account for such serious mental disturbance.

Fortunately the majority of the cases tend to recover. The nurses are always glad to see a "puerperal," as they know that their efforts will in all probability be rewarded by the recovery of the patient, and I have always noticed a remarkable bond of sympathy between nurses and patients suffering from puerperal diseases. I have been particularly impressed with the large number of cases in which albuminuria was present, over 62 per cent.; in several cases the albumin disappeared in a few days, in others it persisted for many weeks. This, of course, is no new observation. Many distinguished physicians have observed it, and Sir James Simpson, as long ago as 1857, in the *Transactions of the Edinburgh Obstetrical Society*, recorded several cases.

MILL ROAD INFIRMARY.

Return of Cases of Puerperal Insanity admitted during six years 1900–1905.

Year.	Admissions.	Discharges from Infirmary.			
		To Asylums.	Cured.	Died.	Total.
1900	14	8	3	3	14
1901	15	10	4	1	15
1902	18	15	2	1	18
1903	21	15	5	1	21
1904	9	5	4	...	9
1905	19	14	3	2	19
Total	96	67	21	8	96
1905	6	1	3	...	...
	102	68	24	8	100 (2 under treatment)

He says: "As far as my experience of puerperal mania goes, albuminuria precedes and attends the first access of puerperal insanity in a large proportion of cases, but perhaps not so frequently and so constantly as it precedes and attends upon attacks of puerperal convulsions. I have found it present in eight out of ten cases of puerperal insanity at the commencement of the disease. The coagulability of the urine in puerperal insanity generally disappears within a short time after the attack commences, and hence disappears more speedily than happens in puerperal convulsions. The fire of disease goes on burning in these cases of insanity after the lighted match is merely applied, and the strange morbid clockwork runs on as it were after the key that wound it up is withdrawn. I have seen all traces of albuminuria in puerperal insanity disappear from the urine within fifty hours from the access of the malady."

These were the words of one of the great masters of medicine written fifty years ago. They are true to-day. We have made little advance in our knowledge of this condition, although our treatment of it may have improved.

When Sir James Simpson was asked, "What is the special morbid change, or what is the special morbid agent in the blood which, when accumulated there in sufficient quantity, produces puerperal mania?" he replied, "We know not yet, and will not know till pathological chemistry, which is still in its first infancy, has grown and advanced to an extent and certainty infinitely beyond its present very limited bounds."

Personally, I have little doubt that biological chemistry will give us the solution of this and many other toxic conditions in the near future. In my series of cases mania was more commonly met with than melancholia—there were seventy-one cases of mania and thirty-one cases of melancholia.

The cases in which mania was present showed a quicker tendency to recover than the melancholic ones, although the symptoms were more acute.

Insanity of pregnancy.—All authorities are agreed on the comparative rarity of insanity associated with pregnancy. Bevan Lewis only saw eleven cases out of 1814 female admissions. In my series of 102 cases only six were pregnant on admission.

The insanity of pregnancy generally develops between the third and the seventh months, and I have a woman under observation at present who has become insane during four successive pregnancies, always at the fourth month, and generally lasting three or four weeks. The symptoms are generally those of moral perversion, with melancholia and delusions of fear, suspicion, and persecution. Insomnia is a persistent and troublesome symptom, and destructive tendencies are common.

It requires no very close observation of pregnancy and the puerperal period to discover that the mental as well as the bodily functions are in a very considerable proportion of all cases disturbed.

The psychological phenomena to which I refer are far from being symptomatic of mental unsoundness, or what we call insanity. It is by no means an uncommon thing for the temper of the woman to be changed for the worse during the course of a pregnancy. She becomes fretful, capricious, and in many indescribable ways different in disposition from what had hitherto been her individual characteristics. The emotional faculties are less under control, when the ceaseless tears or laughter indicate an hysterical disposition, and in many cases the organs of special sense, and especially those of taste and smell, are strangely perverted, in a manner which all of us have had opportunities of observing. We may therefore venture to assume that this psychological sensitiveness can scarcely fail to predispose to a more serious disturbance of the mental faculties. It would naturally be expected that illegitimacy would favour the production of insanity in the mother, and that a young girl finding herself pregnant would lose her reason. My experience does not favour this view; in fact, I have been surprised at the comparative rarity of any serious mental disturbance during pregnancy, however sad the circumstances are in some instances. The treatment of this distressing condition is largely expectant. In those cases with an hereditary tendency towards insanity the outlook is grave, as the patient may drift into permanent dementia.

A question of great importance to the doctor is, Should abortion be induced? If the disease occurs before the fourth month of pregnancy, Clouston is of opinion that it should, and with ordinary care there is little risk in this procedure. In support of this treatment we have the fact that the insanity passes off after delivery as a rule, and not before, although there are exceptions.

Personally, I have never induced abortion for insanity of pregnancy. All the cases went to full term, and were delivered of healthy children. Four mothers recovered before delivery, and two after. It is a sad experience to witness the labour of a woman suffering from acute mania or melancholia, although the delivery does not appear to be adversely influenced by the serious mental disturbance.

The full consent of the relatives must first of all be secured before abortion is induced. A good stimulating diet should be prescribed, and special attention should be given to the action of the kidneys, and any tendency to albuminuria obviated if possible.

The treatment is otherwise that of ordinary mania or melancholia, and the prognosis is in most cases favourable, and tends to complete recovery after delivery. The object of this short paper is twofold—first, to direct attention to the large percentage of cases in which albuminuria was observed in the acute forms of insanity, and the important rôle it plays in the production of abnormal mental states; and secondly, as to the best means of treatment of a typical case of puerperal insanity in a primipara. We are all familiar with the hospital methods of treatment.

Is it desirable to remove a young married woman who has developed insanity after the birth of her first child to an asylum, and have her certified as a lunatic?

The answer is not easily given. On the one hand, we have to bear in mind that puerperal insanity is, on the whole, the most acute of all the forms of insanity, and that the risk of death is greater than in any other form of acute curable insanity, for over 8 per cent. of the patients die during the attack. A never ceasing supervision and plenty of nurses are absolutely necessary to give the patient the best chance. Then, again, the patient is often very noisy, refuses her food, and has to be restrained. This necessitates a medical visit at least twice a day. If the patient is in such circumstances as to allow of all this to be done at her own home, and the house to be turned into an asylum for the time, she can be treated at home, or, if not, she may be removed to a nursing home if she is fairly quiet.

There is a growing feeling on the part of the public against sending such cases to lunatic asylums, and I must confess I agree with it. The social stigma to the mother is great, and she looks forward with dread to any future confinement. The child, too, suffers socially. There can be no doubt that the mother is for the time insane, but she can hardly be classed as a lunatic. I think some elasticity is required in our lunacy laws to allow such cases to be treated at least for three months without certification, under the direction and supervision of medical men who have had experience in insanity. There can be no doubt that the treatment provided in a modern asylum is excellent, but that can only be obtained by certifying the patient as a lunatic, which in my judgment is unnecessary. The woman is suffering from a temporary derangement of her nervous system, brought about by the puerperal state, and is not comparable to a case of organic disease of the brain producing true insanity. It has always seemed to me a hardship that the respectable middle and lower classes should have no other opportunity for treatment of puerperal insanity than the workhouse or the lunatic asylum. There is a feeling of distrust by the husband and other members of the family which is rarely got over, and the poor woman after discharge from an asylum suffers mental distress for years to come. I would like to see established in all large cities and towns reception hospitals for mental cases, where patients might be detained for six or eight weeks without being certified as lunatics; in fact, the reception hospitals to have no connection whatever with the Lunacy Acts. These hospitals would deal with such cases as alcoholic insanity, puerperal insanity, the toxic insanities, delirium, and acute suicidal impulses. If recovery followed six or eight weeks' treatment, the patient would return home as from an ordinary hospital; if recovery was delayed, the patient would be certified as a lunatic, and sent to an asylum.

I feel sure a change in this direction is desired, and will be to the great benefit of the community, whilst not in any way detracting from the usefulness of the asylum.

SOME OF THE PHYSIOLOGICAL CHANGES IN THE MATERNAL ORGANISM DURING PREGNANCY, AND THEIR SIGNIFICANCE.

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DURING the course of pregnancy numerous and important physiological changes occur in the maternal organism. These changes are most peculiar, and rarely follow any definite order; sometimes they appear almost immediately after conception, at other times they do not develop until the later months.

The phenomena commonly associated with the state of pregnancy may be called physiological, and it is usual to speak of pregnancy as a physiological process, still it is only in very exceptional instances that no obvious deviation from normal health during the nine months of gestation is apparent. While most women show great adaptability in meeting the additional demands arising from the altered conditions incidental to pregnancy, still, in many cases, there are evident indications of a breakdown, and then symptoms of an intense blood intoxication may appear, which, if unchecked, may culminate in very grave pathological conditions, seriously endangering life.

In some women, then, whose organs are in a normal condition, the additional demands made upon the physiological functions seem to be satisfactorily compensated for; in others the strain of pregnancy is too much, and to the failure of one or other organ to perform its functions adequately may be attributed the chief complications that arise. In this connection one must always take into account the undetermined personal factor,—by this I mean it to be understood that the manner in which any woman reacts to pregnancy must depend very largely upon her own special temperament, and upon the condition of her various metabolic organs,—the so-called "organs of defence." It is again the question of the seed and the soil, and the nature of the soil is the factor that cannot be determined until it is tested. Hence, when the seed, in the shape of pregnancy, falls upon a healthy soil, as may be found in a woman who has been previously healthy and whose important metabolic and eliminating organs are sound, a series of phenomena develop, fairly constant both in the order in which they appear and also in their character. The pregnancy, under such conditions, will pursue a more or less physiological course without the appearance of symptoms of serious toxæmia. Under other circumstances, however, when pregnancy occurs in a woman whose various defence organs are, for some reason or other, incapable of increased work, it is evident that untoward symptoms will develop. There will be inefficient metabolism, and subsequently imperfect excretion of substances which are more or less toxic in character. What precise symptoms will arise in any given case cannot be predicted, because one does not know the nature of the soil in which the pregnancy is implanted; it is impossible to know what organs are likely to be overtaxed in their duties. It must always be borne in mind, too, that even when poisonous substances are manufactured owing to faulty metabolism, the organism is supplied with many resources which enable it to deal with toxins and render them innocuous. As a rule, it is only when renal action ceases, or is greatly diminished, that one can safely say the other parts of the defensive mechanism will soon be overburdened, and that serious complications will occur.

There are certain physiological changes that take place in the cardio-vascular system as a result of pregnancy.

1. The vascular area is increased in consequence of the development of the uterine blood vessels.

2. The quantity of the blood is increased, especially during the second half of gestation.

3. The quality of the blood is altered; there is relatively more water; there are more white corpuscles, while the fibrin and extractive matters are increased. The red corpuscles, the hæmoglobin, and the albumin are diminished.

4. The systemic and pulmonary veins become greatly overfilled, and this condition of matters is often apparent at the very commencement of pregnancy. Sometimes in the first few weeks the veins of the legs become overfilled and painful, at all events long before the uterus has risen high enough to press upon either common iliac vein. Marked pulsation in the veins of the neck—external and internal jugulars—is also present in many cases very early in pregnancy, and this symptom is infallible evidence of dilatation of the right side of the heart. I have frequently noted the appearance of pulsation in the jugular veins as the result of a pregnancy of a few weeks' duration; indeed, I now regard this sign as one of some value in the diagnosis of early pregnancy. James Mackenzie[1] has directed attention to the fact that there is a tendency to œdema of the lungs in the course of normal pregnancy. This condition I have frequently found, and it points to an engorgement of the pulmonary circulation. The tension in the pulmonary vessels is greatly increased. I wish particularly to emphasise the importance of these remarkable changes in the venous circulation—this tendency to overfilling of the veins, quite early in pregnancy. The significance of this alteration in the circulation has not been sufficiently appreciated, for there is obviously some other explanation than the mechanical pressure of the enlarged uterus to account for it. The matter will be referred to later.

[1] *Brit. Med. Journ.*, London, 1904, October 8.

5. The heart gradually becomes enlarged during pregnancy. Numerous observers have carefully investigated the question of the influence of normal pregnancy upon the maternal heart, and yet there is no unanimous verdict of opinion. Larcher, who made 130 autopsies on women who succumbed to puerperal fever in the Paris Maternity Hospital in 1825 and 1826, asserted that the left ventricle became markedly hypertrophied in pregnancy. More recent contributions to the subject tend to prove that, although some hypertrophy of the whole organ may occur, yet the enlargement is mainly due to dilatation of all the cavities, and more especially of those of the right side. This view is quite in accordance with the circulatory phenomena present during the course of pregnancy, for the heart at this time certainly cannot perform additional work without overstrain. The pregnant woman cannot, as a rule, exert herself with the same freedom that she possessed before conception; therefore one can hardly regard any hypertrophy of the heart which is present as compensatory. Indeed, there is really a distinct inefficiency of the organ as a whole, and whether hypertrophy of the left side occurs or not, what certainly does occur, and generally quite early in pregnancy, is dilatation of the cavities of the right heart.

6. The kidneys become enlarged, and the urine is altered in composition. With the exception of the chlorides, the solids are all diminished in quantity. Hence the urine of the pregnant woman, normally, has a specific gravity considerably lower than that of the non-pregnant. Albumin may appear in the later weeks of pregnancy in about 2 per cent. of cases. Some regard this as a physiological albuminuria; it is safer, however, to look upon all pregnancy albuminurias as pathological.

7. The thyroid gland, liver, and spleen become enlarged and heavier. Of all these physiological changes incidental to pregnancy, I wish, in the first place, to consider the enlargement of the thyroid gland. The hypertrophy of this gland during pregnancy is a well-established fact, and the ancients recognised its occurrence. The exact nature of the enlargement was unknown until 1899, when Lange[1] published his important paper on the thyroid gland in relation to pregnancy. Lange pointed out the precise significance of the enlargement of the gland during pregnancy, and showed that it took place in response to a call for an increased supply of thyroid secretion. Thus, when he gave thyroid extract to pregnant women who showed the hypertrophy, the gland rapidly diminished in size; when treatment was stopped, the gland almost immediately began to enlarge again. Pregnancy puts an extra strain on the thyroid, and the gland enlarges in order to meet this strain. When artificial secretion—in the form of thyroid extract—is supplied, the strain upon the gland is relieved, and it again resumes its normal size. On this theory

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[1] *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1899, Bd. xi. S. 34.

Murray[1] has shown that progressive thyroid enlargement in young women—simple goitre—can be cured by the administration of thyroid extract. Such enlargements of the thyroid occur, as they do in pregnancy, when there is a temporary call for an extra supply of secretion to meet some derangement of metabolism, associated with rapid growth or with certain changes in the activity of the generative organs at the time of puberty.

It is, then, a very important and suggestive point, that for certain reasons, not yet clearly understood, a larger supply of thyroid secretion is needed in the pregnant than in the non-pregnant state; hypertrophy of the thyroid gland is thus a physiological condition during pregnancy.

On the supervention of pregnancy, the metabolic processes of the body are, of course, greatly increased, but, in spite of this, the metabolism throughout the pregnancy is, in most cases, maintained in a state of efficiency. When one considers how greatly the previous conditions of a woman must be altered in the course of a first pregnancy, the wonder is that the processes of general metabolism do not more often show indications of breaking down; the explanation is to be found in the fact that there is increased thyroid activity in normal pregnancy. The active thyroid gland supplies a secretion which is essential to the maintenance of the normal metabolic round, and if the secretion be either deficient in quantity or impaired in activity the complex processes of nitrogenous metabolism will not go on normally, and certain characteristic symptoms will arise.

Pregnancy seems to predispose to a special condition of toxic poisoning; the condition of pregnancy favours a toxæmia which is peculiar to the pregnant woman. Most authorities are agreed that the toxæmia arises as the result of faulty metabolism, and it leads to the development of certain clinical symptoms which are now well recognised,—high arterial pressure, headache, giddiness, vomiting, and, if still further developed, to albuminuria, suppression of urine, and convulsions (eclampsia).

It is generally held that the toxic substance or substances are metabolic in origin, and the precise disturbance of metabolism which gives rise to them seems to be definitely associated with the pregnant state—that is to say, we do not find quite the same train of symptoms appearing in any other pathological condition. There are now many reasons for believing that a close relationship exists between the thyroid gland system—thyroid and parathyroids—and the conditions which sometimes give rise to the toxæmia of pregnancy, culminating in eclampsia.

It seems probable that the call for increased thyroid secretion occurs at the very commencement of pregnancy, and the gland then gradually begins to hypertrophy so as to meet the additional demand. In normal pregnancy the enlargement does not become obvious till about the sixth month in primiparæ, though in multiparous women it appears somewhat earlier. In the early months of pregnancy there is, therefore, some degree of thyroid inadequacy. It seems worth while to consider some of the changes that occur in the maternal organism during pregnancy in the light of a thyroid inadequacy, the more so as it is not improbable that the occurrence of some of the complications of pregnancy, such as albuminuria, eclampsia, etc., may be ascribed to this cause.

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[1] *Edin. Med. Journ.*, 1900, August.

I shall shortly indicate some points which seem to suggest that this idea is worthy of consideration.

In the first place, with regard to the blood changes in pregnancy, which I have already mentioned, precisely similar changes are produced after removal of the thyroid gland in animals. It is not unreasonable, therefore. to suggest that in early pregnancy these alterations in the blood are connected in some way with a thyroid insufficiency.

To come next to the cardio-vascular phenomena which develop during pregnancy, some of the changes that take place in the maternal circulation at this time—dilatation of the right side of the heart and overfilling of the systemic and pulmonary veins—are very remarkable and very difficult to explain. There is a paradoxical state of matters in connection with the heart of pregnancy. One may find a slow and full radial pulse, quite consistent with a hypertrophy of the left ventricle, in combination with a large pulsation in the jugular veins, giving infallible evidence of dilatation of the right side of the heart. This is a remarkable combination of circulatory phenomena; in a recent communication,[1] I attempted to provide a reasonable explanation of it by assuming that there was some powerful vaso-constricting substance circulating in the blood as a result of pregnancy, that this acted only on the systemic circulation, and that hence the blood from these vessels was squeezed into those of the lungs, and tended to produce an engorgement of the capillaries there. On this view it is possible not only to understand why the left ventricle should undergo some hypertrophy, but also to explain the significance of the overfilled veins and dilatation of the right side of the heart.

In order to understand how these circulatory phenomena can be explained in terms of thyroid inadequacy, it will be necessary to open out the question of the interdependence of the internal secretions. Increasing importance is being attached to the interaction of the internal secretions, and investigation in this direction may lead to the unravelling of many obscure diseases.

As regards the systemic arteries and arterioles, there is abundant clinical and experimental evidence to prove that their calibre is profoundly influenced by the internal secretions of the suprarenal and thyroid glands. Suprarenal extract contracts the arterioles very greatly, partly through the vasomotor nervous system and partly by acting directly on the muscular coat of the vessels themselves. Nothing is so extraordinary about its action as the smallness of the dose sufficient to do this; $\frac{1}{800}$ gr. will constrict the whole arteriole field. The thyroid secretion, on the other hand, has been proved to influence the arterioles in entirely the opposite way. The active principle of the secretion is a specific vaso-dilator, and Oliver[1] has shown that it enlarges the calibre of the arteries in the human subject.

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[1] *Journ. Obst. and Gynæc. of British Empire*, 1905, January.

It may be assumed, then, that under normal conditions, apart altogether from the influence of the vasomotor centre, a balance is struck between these two internal secretions which results in a certain arterial tone. In various pathological states it is certain that this balance becomes greatly disturbed, and the type of circulation which develops under such circumstances often clearly indicates which secretion is overacting, or is being insufficiently antagonised. A proper equilibrium can in many cases be re-established by supplying to the tissues some of deficient secretion in artificial form.

Thus in the disease known as myxœdema the arteries are hard and in a state of contraction, while in Addison's disease they are soft and relaxed. In the one case there is a thyroid insufficiency; in the other, an inadequacy of the suprarenal capsules. Thyroid extract cures all the symptoms of myxœdema, and suprarenal extract brings back the vascular tone in Addison's disease, though it does not invariably benefit the condition in other respects. Oliver has likewise shown that suprarenal extract, taken by the mouth, produces a general diminution of the radial calibre.

Our knowledge, then, of the influence of the suprarenal and thyroid glands respectively upon the arterial calibre has shed some new light upon the circulatory changes of pregnancy, and in several communications I have suggested that the suprarenal secretion itself is the vaso-constricting principle which exerts an exaggerated influence upon the cardio-vascular system at this time. The internal secretion of these glands either becomes too active, or its normal action on the blood vessels is not sufficiently counterbalanced, owing to a deficiency of the thyroid secretion. Hence a prolonged continuance of arterial and arteriole contraction results.

Recent experimental work by Brodie[2] on the action of adrenalin upon the vascular system lends support to this view. It now seems possible to understand some of the hitherto inexplicable circulatory phenomena—dilatation of the right heart, overfilling of the veins, tendency to œdema of the lungs—which have been observed to occur at the very commencement of pregnancy, long before the addition of the placental circulation to the field of work supplied by the maternal heart can possibly operate as a cause. Brodie's observations are of the utmost importance in the interpretation of these early circulatory features occurring in physiological pregnancy, and here also may be found the clue to the mode of production of some of the well-known phenomena associated with the kidney of pregnancy, and with puerperal eclampsia.

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[1] "Pulse-Gauging," London, 1895, p. 84.

[2] *Lancet*, London, 1902, vol. i. p. 804.

Adrenalin causes a large rise in the systemic blood pressure, and this is due chiefly to constriction of the peripheral arterioles. It also acts upon the heart, whose output of blood is nearly doubled. Brodie showed that under the action of adrenalin the pulmonary blood pressure rose to nearly double its original height. The adrenalin acts upon the blood vessels through the vasomotor nervous system, for injection of the drug directly into the systemic vessels causes an immediate contraction, amounting almost to complete closure; while, on the other hand, direct injection into the pulmonary vessels results in a dilatation, and hence in a markedly increased rate of flow—an exactly opposite effect. In this way the very interesting and important conclusion is arrived at, that there are no vaso-constrictor fibres to the pulmonary vessels. Thus the internal secretion of the suprarenal glands powerfully contracts all the systemic arteries and arterioles which are supplied by vasomotor nerves, and the blood contained in them is driven into the pulmonary vessels, which, having no vasomotor nerve supply, are not simultaneously contracted. These vessels, then, become overfilled, and the blood pressure within them is greatly increased. For this reason suprarenal preparations are contra-indicated in the treatment of hæmorrhage from the lungs.

W. B. Drummond[1] has studied the histological changes produced by the injection of adrenalin on some of the glandular organs of the rabbit. Adrenalin produces great congestion of the viscera, and the most suggestive and important fact is that death is due to an acute œdema of the lungs, which is often accompanied by great congestion of these organs. Drummond ascribes these inflammatory changes in the lungs to the toxic influence of adrenalin. This influence is most distinctly seen in the liver and kidneys; upon these organs adrenalin appears to act as a protoplasmic poison. In the kidneys the cells of the convoluted tubules are chiefly affected, and in the liver the cells of the central zone are the first to succumb. These changes in the liver are very similar to those which have been described in eclampsia.

Here are some points which are at least highly suggestive, not only in relation to the early circulatory changes in pregnancy, but also to the toxæmia which sometimes accompanies this state. It is evident that the suprarenal secretion, while causing constriction of all the systemic arteries and arterioles, acts in exactly the opposite manner upon the pulmonary vessels, with the result that they tend to become engorged with blood. Under its action the whole venous system becomes overfilled, and the cavities of the right heart become dilated. These changes, curiously enough, are precisely similar to those which take place in the maternal circulation with the occurrence of pregnancy, and I believe they can be ascribed to a temporary deficiency of the internal secretion of the thyroid which allows the secretion of the suprarenal capsules to exert a too powerful influence on the blood vessels.

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[1] *Journ. Physiol.*, Cambridge and London, 1901, vol. xxxi. No. 2.

The tendency to œdema of the lungs, which I have referred to as occurring even in the course of normal pregnancy, is an observation full of interest and suggestion in relation to what has been already said about the special action of the suprarenal secretion in bringing about an engorgement of the pulmonary capillaries and a congestion of the lungs; in eclampsia, these changes do advance beyond the first stage, and death is sometimes directly due to an acute œdema of the lungs.

The point, then, which I wish to bring out is this; that with the occurrence of pregnancy there is always a serious derangement produced in the relationship of the internal secretion of the thyroid gland to the secretion of the suprarenals. These two internal secretions are, as we have seen, antagonistic, and not only so with regard to their action on the blood vessels, but also in their influence upon the metabolic processes of the body. Thyroid extract powerfully stimulates both metabolism and elimination, increases largely the secretion of urine and the excretion of urea and other urinary substances. Suprarenal extract lowers the general metabolism, and may, as I shall mention later on, lead to a complete suppression of the urinary secretion. In the early months of pregnancy an additional supply of the thyroid secretion is called for to meet the requirements of increased metabolism, and then the suprarenal influence will become too pronounced. On this account the remarkable changes which develop in the maternal circulation can be explained—for they sometimes commence immediately after conception. Later on, in normal pregnancy, the balance between the two internal secretions becomes readjusted by the fact that the thyroid gland undergoes hypertrophy; then, as is well recognised, improvement in many of the troublesome symptoms of pregnancy occurs. If suprarenal overaction is not counterbalanced by thyroid hypertrophy, serious complications may arise. Lange observed pregnant women in whom this physiological enlargement of the thyroid did not occur, and noted what happened under such circumstances. Some clinical facts and experiments on animals have also indicated what abnormal symptoms may arise during pregnancy and the puerperium when thyroid hypertrophy is absent. Out of 133 pregnant women examined by Lange, 108 showed hypertrophy of the thyroid, and in twenty-two cases it was absent. In three instances it was doubtful. Of the twenty-two abnormal cases, sixteen had both albuminuria and tube casts (pregnancy kidney), which in six instances terminated in eclampsia. Of the 108 women who had a normal thyroid hypertrophy, only two had albumin in the urine, and in these there was a history of renal disease previous to pregnancy.

A study of the circulatory features observed throughout the course of normal pregnancy strongly suggests that there are periods during which one or other of these opposing internal secretions—thyroid and suprarenal—gains the upper hand.

During the past four years I have devoted a considerable amount of attention to this matter, and my observations lead me to state that one can divide pregnant women into two classes according to the type of circulation they present. These types of circulation seem to me to bear a very close relationship to the state of the thyroid activity; each type, when fully developed, is characterised by certain features which are readily recognised. Thus some women, chiefly multiparous, develop after the early months of pregnancy the kind of circulation which one may quite reasonably associate with a surplus of thyroid secretion. The pulse is greatly quickened—in some cases the rate never falls below 100 per minute—and is bounding in character; the arterioles of the skin are relaxed, giving rise to a subjective sensation of warmth, and jugular pulsation is usually well marked. There are evidences of dilatation of the right heart, without any noteworthy left ventricular hypertrophy. Commonly enough the veins of the legs are much over-distended and painful. You can form the best conception of this type of circulation if you compare it to that present in Graves' disease; the circulatory phenomena are identical in both cases. I have called this type in pregnant women the "Graves' disease" type, and it must be well known to every obstetric physician. In these women there are evidences that the metabolic processes of the body are stimulated; the secretion of urine is largely increased, and the excretion of urea is not markedly diminished. Albuminuria is sometimes present, but it bears no grave significance; sometimes, also, there is a considerable amount of general œdema, which pits readily on pressure. Usually, however, these patients are thin. A point well worth noting is that in women in whom this type of circulation is fully developed, severe and troublesome hæmorrhage is specially liable to occur during the third stage of labour; the explanation of this may be that the normal suprarenal influence on the vessels is much diminished. The most interesting and suggestive thing about such patients, so far as my experience goes, is that in them one need never have the least anxiety about the occurrence of eclampsia.

There are other women, most commonly primiparæ, who, after the mid-term of pregnancy, begin to exhibit symptoms which clearly indicate that the suprarenal influence on the arteries and arterioles is becoming too pronounced. Here, again, one can trace the gradual development of definite circulatory features, and, coincidently, various other symptoms make their appearance. When there is only slight or not too long-continued overaction of the suprarenal secretion, the pregnancy may still progress within physiological limits, but there are certain signs, now well recognised, which seem to mark the borderland between physiology and pathology. In extreme cases of this type one may note, in the latter months of pregnancy, that the pulse rate has fallen considerably, that the radial artery is firm and resistant, and that the blood pressure is markedly raised. The superficial arteries are contracted. There are generally evidences of some dilatation of the right heart, for a venous pulse is frequently present, but the left ventricle may also undergo considerable hypertrophy. The metabolism, in these women, is markedly diminished, and is very liable to break down. The secretion of urine may be somewhat increased for a time, but it is of very low specific gravity, and the urea excretion is notably below the normal; later on the urinary secretion becomes scanty, and may be entirely suppressed. I may, in passing, direct attention to the very significant fact, that this kind of suppression of urine is found in association with an enormously high systemic blood pressure, and firmly contracted arteries.

Albuminuria in most cases of this type is a symptom of serious import. Œdema is generally present, and is of a peculiar solid character, only pitting on firm pressure. This kind of œdema is frequently overlooked, because it is generally supposed that the patients have simply put on fat during pregnancy; but it is really, in my opinion, an œdema very similar to, if not identical with, that present in myxœdema. It melts away under the action of thyroid extract in the same way as myxœdematous swelling does, and it is probably the result of a thyroid insufficiency. Most practitioners must have observed this kind of œdema in pregnancy, and must have recognised that it is very different from the soft œdema associated with cardiac or renal disease.

Patients in whom this type of circulation—which may be called the "myxœdema type"—is fully developed have no tendency to post-partum hæmorrhage; in them the suprarenal activity on the vessels is greatly increased.

It is patients of this kind, however, who are liable to develop eclampsia, and it is, therefore, a matter of great practical importance to recognise the occurrence of these circulatory changes and check their further development.

I have attempted to show how some of the physiological changes that occur in the maternal organism in early pregnancy may arise as a result of thyroid inadequacy. If the inadequacy is not made good later on by an enlargement and increased functional activity of the gland, then these physiological changes may become pathological, and complications of the gravest kind will ensue. I have already mentioned, as one of the physiological changes in pregnancy, that the kidneys become enlarged, and I might now indicate what I believe to be the nature of the so-called kidney of pregnancy, which, with its accompanying albuminuria, leads up sometimes to that hideous train of symptoms known as puerperal eclampsia.

There would seem to be little doubt that whatever the precise cause of the kidney condition referred to, it has its origin in some disturbance of the renal circulation, whereby the flow of the blood through the kidney is lessened. The quantity of urine secreted by the kidney in a given time is very closely connected with the rate of the blood stream passing through the organ; hence a spasmodic contraction of the renal arterioles, by cutting off the blood supply to the glomeruli, will greatly diminish, and may possibly completely arrest, the secretion of urine. It must be borne in mind that it is the pressure of blood in the glomeruli of the kidney that determines the amount of the secretion of urine; increased secretion does not depend entirely upon a high general blood pressure. Anything that causes a contraction of the arterioles of the body generally will raise the pressure in the arteries, and will, at first, raise the pressure in the glomeruli also. Then there will be an increased secretion of urine. But if contraction of the arterioles becomes so widespread and pronounced that the smaller branches of the renal arteries are involved, then the presure in the glomeruli may become so greatly reduced that the secretion of urine ceases entirely. This is what happens in eclampsia, and hence we find the combination of enormously high general blood pressure with perhaps complete suppression of urine. It is surely evident that the only way to re-establish the secreting function of the kidneys under such conditions is to get blood to flow through them again. One way to do this is to dilate the renal arteries. This result may be brought about by the administration of various substances which produce a general vascular dilatation, and then the glomeruli will soon become flooded with blood, and diuresis will commence. Another method of starting the flow of blood through the kidney, and thus re-establishing the secretion of urine in eclampsia, has been suggested by Edebohls.[1] I refer to the operation of decapsulation of the kidney, and I fully recognise its value in cases where one cannot let the blood into the kidney through the renal artery. The splitting of the kidney capsule, by relieving the tension and letting some blood escape, may quite well restart the circulation through the kidney, and save an apparently moribund patient.

Now, whether this abnormal constriction of the blood vessels—

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[1] *Journ. Am. Gynec. Soc.*, Phila., 1903, vol. xxviii.

including those of the kidney—which occurs in some cases of pregnancy, is brought about by suprarenal overaction or by some toxic influence, we do not know. So far as I am aware, we know of no toxin which can at all compare with the internal secretion of the suprarenal glands as a constrictor of the arterioles and capillaries. Normally, I believe, the thyroid secretion is the opposing influence which safeguards the renal circulation from dangerous overaction of the suprarenals; but in some cases of pregnancy in which there is a thyroid insufficiency, it seems quite possible that such an overaction does occur. In this way the production of the symptoms of eclampsia would be adequately accounted for.

Here then you have the rationale of my suggestion to use thyroid extract to re-establish the flow of urine in eclampsia, and you will understand why I insist on employing very large doses in order quickly to counteract the abnormal suprarenal action on the arteries. The arterioles must be relaxed so fully as to alter the type of circulation from one of intense vaso-constriction (myxœdema type) to one of extreme vaso-dilatation (Graves' disease type). Thyroid extract is the ideal vaso-dilator for this purpose, but it must be given in very large doses—30 to 60 grs. at a time—so as to produce symptoms of "thyroidism" as rapidly as possible. Then the renal vessels seem to relax, and urine is again secreted; but in some cases a large flow of urine does not result for several days. Morphine, given hypodermically and in a sufficiently large dose ($\frac{1}{2}$ to 1 gr.), is probably the most powerful and prompt vaso-dilator we possess, and in severe cases I have always used this remedy in the first instance, and then followed up with thyroid. If eclampsia is treated medically, I think the combination of these two remedies provides a very successful means of rapidly re-establishing the secretion of urine.

In the presence of actual eclampsia, then, I employ these large doses of thyroid, and the remedy is used mainly for its vaso-dilating action. If much larger doses were given, I believe the results would be still better. The hypodermic injection of the juice squeezed out of a sheep's thyroid would be the best way to produce rapid effects. Macnab[1] obtained a striking result by dissolving the dry extract in saline and infusing the solution under the mammæ; and thyroid may be given in this manner *per rectum* to a comatose patient. I wish to emphasise the fact that thyroid is not a dangerous remedy in eclampsia; there is in this disease the same tolerance to thyroid as pain gives to opium. Eclamptic patients, when convulsions are present, likewise exhibit a remarkable tolerance to morphia.

From what has been already said, it will be gathered that, quite apart from the treatment of actual eclampsia, there should be a wide field for the use of thyroid extract in the treatment of many conditions connected with pregnancy and the puerperal state, which are almost certainly associated with defective metabolism. Thyroid may then be used to stimulate the metabolic processes, and for this purpose small doses (5 to 20 grs. in the twenty-four hours) are sufficient. At the same time the diet should be restricted to milk and other articles containing no animal proteid. In the therapeutics of pregnancy, one of the most striking things is the remarkable influence of an exclusive milk diet in the prophylaxis of eclampsia, and the explanation of the success of this treatment is to be found, I believe, in the relation of nitrogenous food to the thyroid secretion. Proteid food uses up too much of the thyroid secretion, and this form of food also yields very little iodine, which substance is essential to the gland for the manufacture of iodothyrin.

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[1] *Journ. Obst. and Gynæc. of British Empire*, 1904, November.

In the course of pregnancy such symptoms as persistent headache, vomiting, and diminished secretion of urine, may occur, and these are properly regarded as being due to some toxic condition. Patients who suffer in this way do not in all cases develop eclampsia, but they generally feel very ill and low-spirited. I have given thyroid extract to a very large number of such cases—sometimes for many weeks at a time—with complete safety, and always with most beneficial results. The mental depression soon disappears, and the other symptoms are removed. I am forced to the conclusion that this remedy sometimes supplies an important want to the mother during pregnancy. I have treated some cases of hyperemesis gravidarum with thyroid with most gratifying results; and it has recently been shown that other complications of pregnancy, such as chorea and melancholia, can be definitely controlled by the use of this substance.

I have brought forward, in a rather disconnected way, some evidence which supports the view that thyroid insufficiency in pregnancy may be responsible for certain physiological changes that occur in the maternal organism, and I have also attempted to show that there is probably an intimate relationship between inadequate thyroid function and certain pathological conditions which develop during pregnancy, such as "pregnancy kidney," albuminuria, eclampsia, chorea, and other nervous diseases.

I hope I have directed attention to some points which may be suggestive to others, and which may assist in elucidating the riddle of puerperal eclampsia.

IS THERE A DECIDUA REFLEXA?

By James Oliver, M.D., F.R.S.(Edin.), F.L.S.

There is a general belief that, almost immediately the fecundated ovum arrives in the human uterus, the decidua grows up around it, and so envelops it, that rapidly it becomes lodged in an accessory ovigerous chamber constituted solely of a so-called decidua reflexa. Too unhesitatingly, in my opinion, and on very slender testimony, the existence of this periovular uterine product has been admitted and proclaimed.

As soon as the fertilised ovum reaches the cavity of the uterus, there is an augmentation in the vascularity of the whole endometrium, but not until about the third week of incubation do the villi of the chorion themselves become vascular. Until about the sixth week of pregnancy the entire villous chorion plays the part of placenta, the well-being of the embryo during this period being maintained by materials obtained from the maternal tissues and transmitted by all the villi indiscriminately. If the dogma, which I here gainsay, be accepted, then the human ovum during the early days is mainly nourished indirectly by the uterus through the medium of this decidua reflexa. The interposition of such a structure from a nutritive point of view would be not only unnecessary but positively harmful.

Let us cursorily glance at the question of placentation with some of the lower animals, and note what obtains in them. In Cetaceæ the fœtus during its entire intra-uterine life is sustained, like the human embryo during the early days, by the whole chorionic surface, as virtually the chorion is everywhere placental. The villous bodies to all intents are alike, and all are equally capable of imbibing and transmitting not only the materials necessary for the development and growth of the fœtus, but those resulting from metabolism. In horned Ruminants we find a remarkable modification of this universal placenta: some villi atrophy, whilst here and there over the entire surface of the chorion groups of villi augment in size and proceed to form placentulæ. These patchy overgrowths take place at spots corresponding with the cotyledonary processes or caruncles which stud the interior of the uterine horns of these animals. So numerous may these cotyledonous placentulæ be, that as many as eighty may sometimes be counted in the case of the cow. Again, in the cat and Carnivorous animals generally, the placenta is more or less annular, the villi participating in its formation being grouped together like a belt, whilst the villi over the rest of the chorion are scarcely discernible. In none of these animals is a decidua reflexa formed, and the same holds good of the monkey too. Moreover, when in the human female a fœtus is matured outside the uterus altogether, the placenta evolved under such circumstances is as efficient as, and differs structurally in no essential from that formed normally in the uterus, yet its evolution and growth are completed without the aid of either a decidua reflexa or a decidua vera, and, strictly speaking, without even the aid of a decidua serotina.

In the human female the placenta is, as a rule, single and discoid. It is invariably thicker towards the centre than at its circumference. It begins to form during the fifth and sixth weeks of pregnancy, and is the resultant of one-fifth of the chorionic structure: the villi over the remaining four-fifths, atrophying gradually thereafter, do not participate in its formation. The placental villi are irritable bodies, and coming in contact with an opposing vital structure—the uterus—this forthwith responds to the contact-stimulus, and there results great local activity, the initial change being largely vascular. The blood capillaries confined to this circumscribed area of the endometrium begin rapidly to dilate and form sinuses, a transformation which, at this stage at least, is effected largely at the expense of the walls of the vessels themselves, as these become correlatively more and more thin. Whilst this change is proceeding on the surface of the endometrium, the deeper vessels are enlarging commensurately, and the vessels of the uterus generally are preparing to cope with the increasing demands which throughout gestation will be made upon them. The maternal capillaries, thus physiologically attenuated, approach the chorion and insinuate themselves into the intervillous spaces, which become at the same time crowded with subchorionic cells. From these cells the maternal blood spaces receive very material support, but the maintainence of the integrity of the latter depends more especially upon the harmonious manner in which the chorionic and uterine surfaces concerned in the formation of the placenta act and react upon each, and towards this the amniotic fluid which begins to be poured out about the third week of pregnancy adds its quota. If from any cause, say atony of the uterus or plumbism, this harmonious interaction becomes disturbed, then a breach in the continuity of these blood spaces may result, and hæmorrhage, free or confined, according to circumstances, will then ensue. During the sixth, and in a few rare cases as early even as the fifth week of pregnancy, the rapidly dilating maternal capillaries, especially those located towards the circumference of the placental area, being inefficiently supported, may spontaneously rupture and cause external hæmorrhage. Thus produced, hæmorrhage may for a time be very free and somewhat troublesome, but being eventually arrested, development and growth may progress, and the child matured under such circumstances, and born in due course, may be as vigorous and healthy apparently as one nurtured under more favourable conditions. If an ovigerous chamber constituted of decidua reflexa existed, then blood extravasated from the maternal sinuses would in the first instance accumulate in this decidual sac, and could only escape externally by bursting these confines, a procedure which would inevitably prove fatal to the ovum itself.

PENTOSURIA, CHRONIC AND ALIMENTARY.[1]

By R. W. Johnstone, M.A., M.D., *Junior Assistant to the Professor of Midwifery, University of Edinburgh.*

In view of its scientific interest, and its importance in connection with medical examinations for life insurance, the subject of pentosuria deserves a great deal more attention than has been accorded to it in this country. Of the score or so of cases found in the literature, considerably more than half have been recorded by some half-dozen observers in Germany. And while it may possibly be a condition which, like diabetes, is more common in Germany than here, yet it is more probable that in this country cases of pentosuria have been allowed to pass unrecognised. It is therefore of importance that publicity should be given to such cases as *are* recognised.

But, first, what is pentose? Pentose is a monosaccharid with five atoms of carbon and the formula $C_5H_{10}O_5$. It does not occur free in nature, but its anhydride pentosane is found in fruits, especially cherries, apples, pears, and plums; in corn and, to some extent, in all vegetables.

There are three main forms of pentose—arabinose, xylose, and rhamnose—whose properties are briefly as follows. Arabinose occurs in various forms—dextro-rotatory, lævo-rotatory, and optically inactive. It gives positive reactions to the following tests for sugar—Trommer's, Fehling's, Moore's, Nylander's, and the phenylhydrazin test. It does not ferment with yeast. Xylose and rhamnose are less optically active, but otherwise are almost identical with arabinose in their reactions.

Pentose may be recognised roughly by two tests—Tollens's test and the orcin-hydrochloric acid test. Tollens's test is carried out as follows. Three c.c. of urine are mixed with an equal quantity of fuming HCl in a test tube, and a few grains of pure phloroglucin added. The tube is then placed in boiling water. If pentose is present, a cherry red colour at once appears, followed by a black precipitate. This precipitate is now filtered off and dissolved in alcohol, forming a purplish solution, which, when examined with the spectroscope, shows an absorption band in the yellow and green part of the spectrum between the D and E lines of Frauenhofer.

The orcin-HCl test is practically the same in its technique. Orcin is used instead of phloroglucin; the colour is a bluish-green, not a red; and the band in the spectrum is between the C and D lines of Frauenhofer.

The only fallacy in connection with these tests is due to the possible presence of glycuronic acid in the urine, but this may be eliminated by finding whether the patient has taken any drugs which would produce a paired glycuronic acid in the urine. Such paired acid gives a positive reaction in Tollens's test, but not to the orcin test. It is still a question whether the unpaired acid ever appears in the urine or not.

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[1] From the laboratory of Professor von Jaksch at Prague.

It must also be noted that if pentose be present only in small quantity in the urine, the reduction tests for sugar are often delayed—the yellow oxide appearing perhaps only after the tube has cooled for some time.

Glancing now very briefly at the reported cases of chronic pentosuria, we find that the first case is that of Salkowski and Jastrowitz in Berlin in 1892. This was the case of a man, æt. 29, a morphomaniac and neurasthenic. He had a glycosuria due to morphia, but when he stopped taking this drug his urine continued to give marked reactions to Trommer's, Moore's, and Nylander's tests. An investigation was thereupon made, resulting in the demonstration of pentose—the first time that this sugar had been found in the animal kingdom.

The next two cases are described by Blumenthal. One was a man, æt. 36, always healthy, who was refused by an insurance office as being a diabetic. His urine markedly reduced copper and bismuth salts, but did not ferment. Ultimately the sugar was found to be pentose, not glucose.

The other was a man, æt. 65, considered to be suffering from glycosuria due to nervous disease. In this case there was marked history of nervous disease and diabetes in the family.

The fourth and fifth cases are recorded by Bial. The former was a Polish man, æt. 57, who was considered to have chronic diabetes, small quantities of sugar being constantly found in his urine. He was very emaciated, but otherwise healthy. The urine reduced copper and bismuth salts, but did not ferment. The reducing substance was found to be pentose. The latter was a man of 28, who had no symptoms of illness.

The sixth case is recorded by Fritz Meyer—that of a man æt. 39, with a neurotic family history. He was very pale and thin, and had always been so. He had applied for life insurance, and to his surprise and horror had been rejected as a diabetic. This diagnosis was made upon the grounds of a very strong reaction in Trommer's and Moore's tests—so strong that further tests were considered unnecessary. He consulted his doctor, who, finding that the urine did not ferment, examined for and found pentose.

The seventh case is that of an American woman, who for years had been considered an obstinate case of chronic diabetes, and had been subjected to various Carlsbad and other cures. In her case the urine was found to contain 1 per cent. of pentose, and no glucose.

The eighth, described by Brat, is that of a German woman, æt. 62. Eight years previously she had become ill, and sugar being found in her urine, had been declared a diabetic. She had been for some time on diabetic diet, etc., without benefit, when the sugar was found to be pentose. Thereafter she recovered rapidly, her mind being freed from the fear of diabetes.

The ninth case is that of a brother of this lady, æt. 50, and quite healthy.

The tenth case is recorded by Colombini. It is that of a 50-years old Italian peasant, who came to the skin clinique at Siena with what appeared to be a xanthoma diabeticorum. His habitual diet was almost entirely vegetarian. His urine gave delayed positive results to Fehling's and Nylander's tests, but did not ferment. Pentose was ultimately found to be present. Under treatment, his skin trouble disappeared, and four months later investigation failed to show any pentose in the urine. This case is probably more an alimentary than a purely chronic pentosuria, as the "cure" consisted of his vegetarian diet being changed into a mixed one with milk and flesh. Unfortunately, it is not stated how long the pentosuria continued after the change of diet.

The eleventh case is recorded by Reale. The patient was a morphomaniac, and four days after the intermission of morphia the pentose disappeared. This case also is more probably one of alimentary pentosuria, induced by morphinism.

Other cases are recorded by Caporelli, again in a morphinist, by Barszewski, by Bendix, and by Luzzatto, but I have been unable to obtain the records of them.

The latest recorded case is that of a man who was sent to Professor von Jaksch at Prague. He had been considered for some time to be a diabetic, although not suffering from any pronounced symptoms. The urine gave positive reactions to the copper tests for sugar, and to Nylander's test. It did not ferment with yeast, and was optically inactive. Pentose was found to be present, the urine giving positive reactions to Tollens's, the orcin-HCl, and other tests, and a pentosazone being formed—in this case not in stars, but in the rarer form of wavy threads. Minute investigations were made by Dr. Franz Erben, who showed that the pentose was inactive arabinose.

Several very interesting observations were made upon this case. The ingestion of large quantities of glucose, lævulose, and lactose had no effect upon the quantity of pentose excreted in the urine. Further, the ingestion of arabinose was followed by an increase in the quantity of arabinose excreted, strictly in proportion to what had been given in the diet. Thus, in this case at least, none of these sugars was the source of the pentose which appeared in the urine.

The question now arises whether pentosuria is what might be termed a pentose-diabetes. A diabetes is characterised by an inability on the part of the body to consume all the carbohydrates of the food. In pentosuria this does not occur. As has just been noted, quantities of glucose, lactose, and lævulose made no difference in the quantity of pentose in the urine in Erben's case. And these experiments have been made in other cases also with similar results. The administration of pentose itself, moreover, was followed by a strictly proportionate increase in the pentose in the urine. In a diabetes, any such administration of glucose would be followed by the excretion of an excess of glucose over the usual quantity, much greater than the quantity actually given in the food. For these reasons, therefore, pentosuria cannot be regarded as a pentose-diabetes.

It is more analogous to the condition of lævulosuria, where there appears to be some anomalous formation of lævulose in the organism, although the capacity to deal with the lævulose of the food remains unaltered.

Pentosuria has been called an anomaly of assimilation, for the reason that no explanation of it can be offered. There is no reason from the clinical data at our command to fix suspicion on any one organ or function; and unfortunately, in the only autopsy made on a case, so far as I know, no detailed examination was made, owing to an accident. The question remains, What is the source of the pentose—the body, or the food?

Putting aside cases of alimentary pentosuria, in which, as the name implies, the food is clearly the source of the sugar, many arguments have been adduced to prove that in cases of chronic pentosuria also the pentose is derived from the food. Detailed chemical processes have been worked out to show how the usually optically active pentose of the vegetable kingdom can be changed into the optically inactive pentose of chronic pentosuria. Methods have been demonstrated by which glucose can be oxidised into pentose and glyconic acid; and it has been suggested that, in the pentosuric, this process stops at the stage of pentose, while in the normal person it goes on to the glyconic acid stage. It has also been shown that the dextro-rotatory galactose, which is a product of the digestion of lactose, may be changed into inactive arabinose. Against all these theories may be pitted the fact that pentosuria has been induced in *starving* dogs by extirpation of the pancreas.

In favour of the body as the source of pentose is the repeated demonstration of pentose in the nucleo-proteids of many of the organs of the body. But it has been shown that in the pentosuric there is no evidence of an unusual destruction of nucleo-proteid going on, inasmuch as in the urine the uric acid and phosphoric acid totals remain normal.

Owing to the paucity of cases recorded, and the somewhat disconcerting lack of symptoms in a number of these, it is impossible to draw up any array of symptoms of pentosuria. There are, however, one or two points common to several cases. There is, firstly, an hereditary neurotic taint. In connection with this it is to be noted that, in the last few years, Bial has shown that pentosuria occurs as a "family" anomaly. The frequent association of a drug habit with this condition may be put down as merely a manifestation of the neurotic taint, although, in the case of morphia, there may be some causal connection. Of actual symptoms we find obstinate neuralgia, general asthenia, extreme thinness, and extreme pallor occurring in several cases. In no recorded case has there been any real polyuria or excessive thirst; and, as a rule, the specific gravity of the urine has not exceeded 1025.

Diagnosis.—The diagnosis is simple. Provided a urine contains a substance which reduces copper sulphate on heating, which does not ferment with yeast, and which gives Tollens's and the orcin-HCl tests, one is justified in declaring it to contain pentose. Further proof is to form from it an osazone with a melting-point about 160° C. If this condition of the urine is found to be constant, and independent of the nature and quantity of the carbohydrates in the food, one may declare the condition to be chronic pentosuria.

Prognosis.—In this connection we are hampered by inexperience. There would appear to be no increased liability for a pentosuric to become a diabetic. And pentosuria does not cause that increased liability to infectious and other diseases which is such a dreaded feature of diabetes.

Treatment. — Diabetic treatment is worse than useless. A moderately full diet, with milk and flesh and a limited quantity of carbohydrate, appears to be the best. A pure proteid diet only aggravates any neuralgic symptoms that may be present. So far, drug treatment has been of no avail. Opium, as will be shown below, actually increases the quantity of sugar in the urine.

ALIMENTARY PENTOSURIA.—Since the discovery of the clinical entity known as "chronic pentosuria," many observers have noted the existence of an alimentary form of pentosuria. Just as in most persons the ingestion of an excessive quantity of carbohydrates, from which glucose can be formed, leads to an "alimentary" or "dietetic" glycosuria, so in most persons the ingestion of a large quantity of food capable of yielding pentose leads to an alimentary pentosuria.

Pentosanes, the anhydrides of pentose, and bearing to it the same relationship as glycogen to glucose, are, as has been said, present in considerable quantity in fruits and vegetables. Pentose itself is present in almost all beers and in prepared fruit juice beverages.

Alimentary pentosuria has been found most frequently in summer, when large quantities of fruit and vegetables are consumed, and large quantities of beer and prepared "non-alcoholic" fruit juices drunk. This was first pointed out by Professor von Jaksch. He showed that, in either healthy or ill subjects, the drinking even of as little as 1 to 1½ litres of such fruit juice was followed by the appearance of pentose in the urine. The urine in such cases gave distinctly positive reactions to Trommer's and Nylander's and Tollens's tests. On the other hand, it did not ferment. Such pentosuria, he observed, persisted for at least twenty-four hours.

Kaliski also reports having met with a man with pentosuria, due to his having eaten a good deal of fruit and drunk much beer. The urine gave a strong reaction to the reduction tests.

It was in continuation of the interesting observations of Professor von Jaksch, and at his suggestion, that the following experiments were carried out.

The aims of the experiments were to discover—(1) If it was possible to induce this alimentary pentosuria in everyone, or if some persons were endowed with the power of resisting it; (2) what was the minimal quantity of fruit juice necessary to produce pentosuria; (3) when pentose first made its appearance in the urine after the ingestion of the juice; (4) how long such pentosuria lasted; (5) whether the secretion of pentose produced any effect upon the total excretion of nitrogen in the urine; and (6) whether the administration of morphia had any effect upon this pentosuria.

Beer was obviously unsuitable for being given in large quantity to hospital patients; so also were raw fruits. Non-alcoholic prepared fruit juice was therefore chosen; and as "apple juice" was found to be the most popular, it was used throughout in these experiments. The exact brand was "Ceres Gesundheit's Apfelsaft."

A number of the patients selected were "nervous" cases in whom the alimentary and urinary systems were quite normal. Several cases were employed in which there was derangement of the liver. No renal cases were taken; but as there is no reason to believe that pentosuria depends to any extent upon the condition of the kidneys, this omission is not of any real importance. Unfortunately, no known case of pancreatic disease was in the clinic at the time.

The method of procedure was simply to give the patients selected a certain quantity of apple juice to drink after examination of the urine. The urine subsequently passed was then examined for pentose. Twenty-five sets of observations in all were made upon eighteen different patients. The following were briefly the conclusions reached in regard to the points enumerated above:—

1. *Can alimentary pentosuria be induced in every individual?*—Only two patients—11 per cent.—showed absolutely no trace of pentose in the urine after drinking 1½ litres of apple juice. Of these, moreover, one showed pentosuria on a second trial being made some time later with the same quantity of juice. The other case was a mild phosphorus poisoning, in which the liver was not much

affected. He left hospital before any observations could be repeated. Case 9 is uncertain.

In this connection two extraordinary results must be noted. One patient (Case 14) drank $1\frac{1}{2}$ litres of apple juice daily for nine consecutive days. On the first and second days after the first dose of juice, the urine reduced copper and bismuth salts, but gave only indefinite reactions to the specific tests for pentose. An osazone was not obtained. Thereafter the urine ceased to show any abnormal constituent for five days, when it again reduced copper and bismuth salts, but gave positive results to no other test for any form of sugar or glycuronic acid—being unfermentable, optically inactive, and not forming an osazone. The only abnormality found after careful investigation was the presence of indican.

Another patient (Case 23) drank 1 litre of juice daily for six days. On the first day after she started, the urine contained pentose very definitely. But after that for ten days no trace of pentose or any other reducing substance could be discovered.

It would require further experiments to determine whether or not these patients developed an "immunity" or "tolerance" to pentose. It is conceivable that the first dose of pentose took the body, as it were, unawares: but that afterwards it was enabled to readjust itself to the altered requirements, and to bring into action an increased "combustion capacity" for pentoses, so that they no longer appeared in the urine.

2. *The minimal quantity of juice required to produce pentosuria.*—With regard to this point it was found that in normal circumstances $\frac{1}{4}$ litre did not produce pentosuria, whereas $\frac{1}{2}$ litre did so in quite a number of cases. So that $\frac{1}{2}$ litre may be taken as about the smallest quantity of juice that is followed by pentosuria. It is very interesting, however, that in two cases $\frac{1}{4}$ litre did produce pentosuria. One of these cases was a patient (Case 18) who was kept constantly under the influence of morphia. The other case (Case 24) was a tuberculous case; and in her $\frac{1}{4}$ litre produced pentosuria only when the administration of apple juice was accompanied by a hypodermic injection of 0·01 grm. morphine.

3. *The interval between the drinking of the juice and the appearance of the pentose in the urine.*—In seventeen cases pentose appeared in the urine within twenty-four hours. In a number of cases more exact times were calculated. The smallest interval noted was three hours, in Case 21, in which $\frac{1}{2}$ litre of juice was given along with morphia. The interval was four hours in Cases 12, 18, 19, and 25. In 12, 3 litres were drunk. In 18 and 19 the patient was constantly under the effects of morphia. In 25 the administration of the apple juice was accompanied by an injection of 0·01 grm. morphia. In other cases the intervals varied from six, nine, twelve, sixteen, eighteen, and twenty to twenty-four hours.

4. *The duration of the pentosuria.*—This must be taken in connection with the quantity of pentosane ingested, as, with the exception of the two cases (14 and 24) already mentioned, the larger the quantity taken the longer did the pentosuria last.

In the two cases where with morphia ¼ litre was effective, the pentosuria lasted twelve hours in the one case, in which only a single injection of morphine was given, and twenty-four hours in the other, where the patient was always kept under the influence of the drug. Where ½ litre was given, the pentosuria lasted from twenty-four to forty-eight hours in different cases.

Where 1½ litres were taken, it lasted for three or four days; in one case for five days.

Where 3 litres were taken, it lasted in two cases for five and six days respectively.

5. *Effect of pentosuria upon the total nitrogen excretion.*—On this point my experiments show no definite conclusion. The nitrogen totals varied, according to the nature of the disease and diet, from about 4·5 to 22 grms., as estimated by Kjeldahl's method. In fifteen cases the total nitrogen excretion was estimated daily for varying periods, during which the patient was taking fruit juice. And whereas in eight the charts seem to point to a diminution of the total nitrogen excretion during the pentosuria period, in the other seven neither increase nor diminution can be observed. More experiments and of longer duration would require to be made before any decision on this question can be reached.

As far as they go, however, these results quite tally with those of von Jaksch after administration of xylose to both healthy and diabetic patients. With non-diabetic patients he found the results uncertain, although with diabetics there was an increase of the nitrogen excretion, showing that these sugars cannot be turned to good account by the diabetic.

6. *The effect of morphia upon alimentary pentosuria.*—The most interesting result of these experiments is, without doubt, the demonstration of the fact that the presence of morphia in the body diminishes its capacity to consume pentoses, so that they are more readily excreted in the urine.

In Case 19, a patient with sarcoma of the pelvis, who was kept constantly under the influence of morphia, a very distinct pentosuria followed the taking of ¼ litre of apple juice—a quantity which, as stated above, produced no effect upon a person not taking morphia.

In Case 22—a tabes dorsalis also kept under morphia—½ litre produced a much more marked pentosuria than was the case with normal individuals.

In Case 20, ½ litre of apple juice alone produced very little effect, while, when it was given along with an injection of 0·01 grm. morphine, a very distinct pentosuria resulted.

A final demonstration is afforded by Case 24, a tuberculous patient, in whom the urinary and alimentary systems were absolutely normal. In her the drinking of $\frac{1}{4}$ litre of apple juice was followed by no trace of pentose in the urine. But two days later (Case 25) $\frac{1}{4}$ litre accompanied by an injection of 0·01 grm. morphine produced a distinct pentosuria; and a pentosazone was easily formed from the urine passed from seven to eleven hours after taking the juice.

The interest of this point is that it enables us to understand why pentose is so frequently found in the urine of morphomaniacs. Undoubtedly the morphomaniac must be less able than an ordinary individual to deal with and "burn up" the pentoses taken in with his food. There is no need, therefore, in such cases to search for the source of the pentoses in the body. They are derived from the food.

Of course this does not apply to such cases as the first case described by Salkowski. That case was clearly one of chronic pentosuria occurring independently of the morphinism, as it persisted long after the morphia habit had been given up. But it seems to me to explain such a case as Reale's, where the pentose disappeared four days after the morphia had been stopped. Such a case I should explain as being one of alimentary pentosuria partially induced by the morphia.

Is it not possible, however, that even in a case like that of Salkowski and Jastrowitz the chronic pentosuria was caused by the morphine habit, a long period of induced inability to completely utilise and dispose of the pentoses in the food leading ultimately to an organic inability to do so?

CONCLUSION.—Considering now the whole question of the chronic and alimentary forms of pentosuria together, it must be admitted that it is a question not only of great theoretical interest, but of great importance to the practical physician. A perusal of the cases recorded in the literature cannot fail to impress one with the fact that this condition may be very easily mistaken for diabetes mellitus. Nor is this mistake a slight one, as a diagnosis of diabetes by a physician is quite calculated to frighten most patients into a more or less morbid condition, even although they may have no symptoms.

It is well known that several substances besides glucose reduce copper salts on heating. But, at the same time, positive reactions to Trommer's test, especially if confirmed by positive reactions to Moore's and Nylander's tests, would be very apt to lead one to make at least a provisional diagnosis of diabetes. Nor is the polariscope a sure test. Dextro-rotation may be due to dextro-rotatory arabinose secreted in the course of an alimentary, not a chronic, pentosuria. And the phenylhydrazin test, as usually performed, is not calculated to show pentosazones, which have to be carefully formed, and carefully looked for in many cases.

It must therefore be emphasised that the fermentation test for grape sugar is the only one quite free from fallacy.

Professor von Jaksch recommends that, if one meets with a urine which reduces Trommer's and Nylander's solutions, one should perform a fermentation test, and either a Tollens's or the orcin-HCl test for pentose. At the same time it is well to inquire whether the patient has eaten much fruit or vegetable food, or has drunk anything recently, which might produce a pentosuria. For it will be recalled that the experiments just described show that, if a man drink 3 litres of fruit juice—not a very excessive quantity in hot weather—his urine may, for *five or six days* even, continue to give quite a marked reduction of copper salts. If the fermentation test is negative while the Tollens's or orcin test is positive, then one is dealing with a pentosuria.

To all medical men who are called upon to examine patients with a view to life insurance, the diagnosis of pentosuria is a subject of special importance. Any confusion with diabetes is of necessity a very serious matter for the applicant, as it would probably lead to his rejection. Under such conditions, above all, in which the patient is seen only on the one occasion, the necessity of diagnosing either a chronic or an alimentary pentosuria from a diabetes, or even a glycosuria, must be emphasised. In such cases a fermentation test should always be made, provided there is a positive reaction to Trommer, either when first heated or after cooling.

What importance should attach to pentosuria in the mind of the examining physician, it is difficult to say. But there seems to be no reason why a higher premium should be paid by the pentosuric than by a patient with merely a trace of glycosuria.

This, of course, must be conditioned by the nature of the pentosuric's symptoms, if any.

It is of considerable importance in this connection, too, to distinguish clearly between a chronic and an alimentary pentosuria, as there is no reason why a person who happens to have a slight alimentary pentosuria should be considered other than a perfectly sound and safe life.

For the sake of brevity, full tabulated details of the observations upon the individual cases are not given. But the following synopsis contains all the important points:—

In Case 12, after 3 litres of apple juice, pentosuria was noted on one to five days inclusive. In Case 13, after 3 litres of apple juice, pentosuria was noted on two to seven days inclusive. In Cases 6 and 8, after 1½ litres of apple juice, pentosuria was noted on two to four days inclusive. In Cases 1, 3, and 15, after 1½ litres of apple juice, pentosuria was noted on two to five days inclusive. In Case 11, after 1½ litres of apple juice, pentosuria was noted on two to six days inclusive. In Cases 2 and 10, after

1½ litres of apple juice, pentosuria was noted on three to five days inclusive. In Case 4, after 1½ litres of apple juice, pentosuria was noted on three to six days inclusive. In Cases 5 and 7, after 1½ litres of apple juice, there was no pentosuria. In Case 9, after 1½ litres of apple juice, the reactions were doubtful, but pentose was probably present on the third and fourth days. Cases 14 and 23 are fully described in the text. In Case 16, after ½ litre of apple juice, pentosuria occurred after six hours, and persisted for at least eighteen hours. In case 17, after ½ litre, pentosuria appeared after twelve hours, and persisted for at least twenty-four hours. In Case 19 (same patient as 18), after ¼ litre of juice, pentosuria appeared in four hours, and persisted markedly for twenty-four hours. In Case 20, the drinking of ½ litre of juice was followed by slight pentosuria in sixteen hours, lasting for four hours. In Case 21, after ½ litre of juice and a hypodermic injection of 0·01 grm. morphine, pentosuria appeared in three hours, and lasted for twenty-four hours. In Case 22 (patient under morphia), after ½ litre of juice, pentosuria appeared in four hours, and remained for at least six hours. In Case 24, the drinking of ¼ litre of juice was followed by no pentosuria. In Case 25 (same patient as 24), the drinking of ¼ litre of juice, accompanied by a hypodermic injection of 0·01 grm. morphine, was followed by pentosuria in three hours, lasting at least eight hours.

THE USE OF THE DOUBLE-WEDGE SPLINT IN TREATMENT OF FRACTURES OF THE HUMERUS.

By George Wilkinson, M.B. (Cantab.), F.R.C.S. (Eng.), *Honorary Surgeon to the Sheffield Royal Hospital.*

Treatment of fractures of the humerus, though perhaps a somewhat trite and well-worn subject, is still one of great importance to patient and surgeon. To the patient, because of the amount of disablement which results from an ununited or badly united fracture of the arm; and to the surgeon, because it is generally acknowledged that these awkward complications are to be found with greater frequency after fractures of the humerus than of any other long bone.

That the methods of treatment in use are not altogether satisfactory is shown by their number and variety, by the different patterns of splints, pads, wedges, or moulded appliances advocated in text-books and by writers on the subject.

Probably no routine method is universally applicable. Every fracture has its own points of difficulty, and requires individual consideration and treatment. Some of the methods in common use appear to me to be wrong in principle, and none to be entirely satisfactory. Chief consideration of the more frequent varieties of bad results of treatment will show the dangers to be avoided and the difficulties to be overcome.

Considering first fractures of the shaft of the humerus, we find that the principal danger is non-union or delayed union. Various reasons are assigned for this want of repair, which perhaps need not be discussed. I believe the usual reason is want of fixation of the fragments. The fragments are difficult to fix. Practically only the middle third of the bone can be surrounded by splints. This allows of little hold on the upper fragment, unless the fracture is quite low down. The inefficiency of splinting must be remedied by binding the arm to the chest wall. This does not, however, give perfect fixation, as the movements of the body are communicated to the arm. Neither does the arm fix accurately against the chest wall without padding.

The internal angular splint is often used in treatment of these fractures, and is even advocated in some surgical text-books. I believe it to be entirely wrong in principle, and its use one of the most frequent causes of delayed union. The upper part of the splint has no hold on the upper fragment unless the fracture is close to the elbow. The elbow-joint is fixed by the splint, consequently every movement of the forearm is communicated to the humerus. Every time the patient rises or sits or lies down the level of the forearm is altered owing to the sling round the neck. Each movement of the forearm causes a movement at the site of fracture, which is converted by the action of the splint into a kind of temporary elbow-joint. It is no wonder that a false joint forms there.

With the object of getting a firm support for the fractured arm against the chest wall, many forms of pads, wedges, or triangles have been introduced. The best known perhaps is Scudder's wedge-shaped pad. I have not found this pattern of wedge altogether satisfactory. It is large and somewhat cumbersome, and thrusts out the arm too far from the chest wall, so that it is carried on a sort of shelf in front of the body. It is difficult to clothe the patient over such a pad. Also it interferes with the perpendicular hang of the arm from the shoulder, by which extension is maintained in the axis of the humerus. Of the various smaller wedges and triangles of wood and millboard, which are recommended by various writers, and of which I have made trial, none have seemed to me quite satisfactory. Small wedge-shaped pads in the axilla do not give sufficient support to the humerus. Large ones press on the forearm at the bend of the elbow, causing swelling of the hand and wrist; all of them have a tendency to slip out behind the arm, when the forearm is brought across the chest to sling it from the wrist, and to be pushed out in front of the arm when the patient is lying in bed.

When one considers for a moment the shape of the space between the arm and chest wall, the reason for the failure of these wedge-shaped appliances becomes apparent. None of them seem to take into account that the forearm must be brought across the front of the chest in order that the wrist can be slung from the neck. With the forearm in this position the space left has the shape of a "double wedge," *i.e.* it is wider below than above, and wider behind than in front. The "double-wedge" splint is designed to fill this space and so form a firm base of support for the broken limb. An external splint of Gooch splinting or cardboard is used in addition to the wedge.

To the back of the wedge are attached three strips of calico bandage, wide enough to encircle the wedge and arm. The outer splint encircles the whole of the front, outer side, and back of the arm. It may be cut out of cardboard or Gooch splinting. It should be well cut away at the lower front corner, to obviate the risk of pressure in front of the elbow. The wedge is placed well up in the axilla, and secured in position by crossing the ends of the flannel bandage attached to its upper end over the shoulder and tying them on the opposite side of the chest. The forearm should then be slung by the wrist from the neck. Care should be taken that the forearm is horizontal. I have found it useful to protect the wrist from undue pressure from the sling, by surrounding it with a trough of cardboard, padded inside. The bandage attached to the back of the wedge should next be tied firmly around the wedge and outer splint, fixing it around the arm. Finally, the arm and wedge are firmly fixed to the body by a bandage round the whole.

Much after stiffness is often caused by confinement of the wrist and hand beneath the clothing. The clothes should always be so put on as to leave the hand and wrist free. It is useful to place a roller bandage in the palm of the hand, which grasps it. The bandage may be tied round the back of the hand to prevent it falling out. If any stiffness of the hand remains after the fracture has united, it will be far less disabling if the hand is in the grasping position, the wrist extended, and the fingers flexed, than if the hand has been confined to the chest wall, with the wrist flexed and the fingers extended.

Swelling of the hand and forearm is generally due to pressure of splints at one or two points, either of an internal splint in the axilla, or of an anterior splint in the bend of the elbow. There is no risk of pressure in the axilla in using the double wedge, as the top of the splint is too broad to pass high up into the armpit. Pressure in the front of the elbow is obviated by having the lower front corner of the external splint well cut away.

In place of the outer splint of cardboard or Gooch splinting, a plaster splint may be used. This gives even better fixation to the arm, and also fixes the shoulder joint. Patients with fractures of the shaft of the humerus are much more comfortable when the shoulder is fixed, as it gives them a sense of security, and also obviates many slight jars which the arm would otherwise receive, and which are very painful in a case of recent fracture.

The plaster splint is made of six thicknesses of gauze bandage material impregnated with plaster in a strip 6 in. longer than the arm from the acromion to the elbow, and wide enough to surround the whole outer side of the arm as it lies on the double-wedge splint. The layers of gauze are fixed together by a line of stitching down the middle. It is split at the upper end, and has bandages attached. It is applied moist to the outer side of the arm, the split ends are crossed over the shoulder, the bandages being brought across the chest and back, and tied under the opposite arm. The plaster splint is fixed on to the arm by tying the bandages attached to the double-wedge splint over it.

The double-wedge splint may also be used with advantage in cases of fracture of the neck of the humerus, in conjunction with a shoulder cap. The form of outside plaster splint just described makes a simple and efficient shoulder cap for these cases. The principal difficulty to be surmounted is the tendency to inward displacement of the lower fragment, and it may be necessary to supplement the action of the double-wedge splints by placing further pads between the splint and chest wall, so as to push it and the arm further outwards.

In cases of fracture of the humerus above the condyles, the double-wedge may be used in combination with the flexion method, or with the anterior angular splint. The flexion method is the one I usually adopt, and it is perhaps the most satisfactory method of treating this troublesome fracture. The one defect of the method as usually applied is that the elbow is left unsupported against the tendency to lateral displacement of the lower fragment. The double-wedge splint gives just this lateral support which is required. The method of application is as follows: The skin in the flexion of the elbow should be well powdered and padded with a fold of lint. The elbow should then be fully flexed, the forearm being in the supine position, and the arm should be placed on the double-wedge splint. A trough of cardboard, padded inside, should be placed at the back of the forearm, and another at the back of the upper arm. The bandages attached to the wedge are then brought round the arm and forearm and tied, so fixing the limb in the flexed position. The Velpeau bandage over all makes a neat and efficient finish. It is thus applied. The first turn passes from the uninjured side, horizontally round the arm and chest. The second turn passes over the front of the chest and forearm, over the shoulder and under the base of the wedge and elbow, up over the shoulder again, and down the back. The third turn takes the same course as the second, rather further inwards, passing between the wedge and chest wall under the forearm. The fourth turn goes horizontally around the whole at the level of the elbow.

The cardboard troughs to protect the arm from undue pressure of the bandages are useful little appliances. One often sees much swelling and stiffness of the forearm and hand in cases treated by flexion at the elbow. This is partly due, no doubt, to the pressure of the swelling at the elbow, but is much increased by pressure of the bandages on the arm and forearm. I have at present under my care a case of Volkmann's contracture, due to fracture above the elbow treated in the flexed position. In this case there was sloughing of a considerable area of skin on the ulnar surface of the forearm above the wrist, due to the pressure of tight bandages.

The double-wedge splint is readily made out of sheets of cardboard by any one possessing a little mechanical skill. In many cases, no doubt, it is a convenience to have the appliance one wants at hand ready for the emergency, instead of having to make it. Sets of double wedges, with outer splints to correspond, are made to my pattern by Messrs. Down Bros. They are in five sizes, to suit patients of all ages. They are reversible, so that both wedge and outer splint may be used for either side.

Massage of the hand and forearm and daily passive movement will do much to correct any tendency to stiffness of the joints. Unfortunately, the number of cases requiring treatment in the out-patient department of a large hospital makes it almost impossible to apply systematic massage to more than a small proportion of the whole number. It is therefore important to obviate the tendency to after stiffness by careful attention to details in applying splints.

THREE CASES OF ACUTE SUPPURATION IN THE MAXILLARY ANTRUM TREATED BY WASHING THROUGH THE NASAL CAVITY.

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While the treatment adopted in the three cases detailed below do not illustrate any novel method of dealing with acute suppuration in the maxillary sinus, they are not without interest, as showing how rapidly and simply cases of this kind may be cured if early treatment is adopted.

Case 1 was that of a woman, æt. 42, who had suffered a good deal from symptoms of vasomotor coryza, and had been more than once under treatment for the condition. In the month of February she contracted a severe cold, accompanied by very considerable discharge from the nose. There was influenza in the house, and her catarrh was regarded as influenzal in origin. She complained of a good deal of pain above the right eye, and the supra-orbital region on that side was tender to the touch.

Examination of the nose five days after the onset of these symptoms revealed the following points:—The mucous membrane of the right nasal chamber was markedly swollen and congested, that covering the anterior end of the right middle turbinated bone being slightly polypoid in character. There was muco-pus visible in the right middle meatus. After cleansing this region and inclining the patient's head forwards, pus reappeared in the same situation. There was tenderness on pressure upon the floor of the right frontal sinus, and percussion over the anterior wall of the right antrum elicited slight tenderness, though not so pronounced as that complained of in the region of the frontal sinus. The first right upper molar tooth was missing; there was no evidence of dental caries. Transillumination revealed opacity of the right antrum, while illumination of the left cavity was fairly bright; it was somewhat difficult to say whether the right frontal sinus illuminated; on the left side, on the other hand, illumination was good. There was no pus in the left middle meatus, nor did any appear after posturing the patient with the head inclined forwards.

The diagnosis made in this case was one of acute suppuration of the right antrum, probably influenzal in nature, the infection of the sinus being of nasal origin. The history further pointed to the fact that the duration of the condition was not more than five or six days. Under these circumstances it was decided to treat the sinus through the nose by puncturing it through the bony wall of the inferior meatus beneath the anterior end of the inferior turbinated body. The parts were cocainised, and the puncture made with a fine trocar and cannula. As the bone was thin, no difficulty was experienced, and the patient suffered no inconvenience. A syringe was attached, and a quantity of non-fœtid pus was washed out of the antrum. The cannula was removed. On the following day no pus was found on examination in the right middle meatus, and the frontal pain and tenderness had disappeared. A second puncture and washing was carried out next day, the secretion now consisting largely of mucus. Two days later there was no pus in the nose, and posturing gave a negative result. Six days after the second washing the nose presented the same normal appearance, and the right antrum was then found to illuminate. The patient had no further trouble.

A point of considerable clinical interest in the case, and one which might possibly have led to a wrong diagnosis, was the existence of the supra-orbital pain and tenderness. This, associated with pus in the middle meatus and an opacity of the right frontal sinus upon illumination, might very reasonably have led to a diagnosis of suppuration in that cavity. It must, however, be remembered that the common site of pain in antral suppuration is in the supra-orbital region. The complete disappearance of the pain and tenderness after washing out the antrum in this case is sufficient proof of this clinical fact. It must not be forgotten that both the frontal and maxillary sinuses may be simultaneously affected, and the diagnosis of the former may only be arrived at after preliminary washing out of the antrum.

Case 2 was that of a woman who had suffered from a severe cold a fortnight before she presented herself for examination. The catarrh was accompanied by a great deal of neuralgic pain in the face, especially upon the left side. She did not notice any swelling of the cheek, but there was considerable tenderness on pressure upon the anterior wall of the left maxillary sinus. The severe pain was relieved by phenacetin. Previous to her recent cold she had had no nasal trouble, but since the cold had passed off she had been conscious of a persistence of discharge from the left nostril.

Examination of the nose revealed the presence of thick yellow pus in the left middle meatus. The middle turbinated body presented a normal appearance, and the nasal mucous membrane was not specially congested. After cleansing the middle meatus and posturing the patient with the head dependent, pus again appeared in the middle meatus. The right nasal cavity showed no abnormality. Transillumination of the right antrum gave a bright illuminated area, while the left antrum was quite opaque. There was no frontal tenderness. The whole of the upper set of teeth had been removed some time previously.

The diagnosis in this, as in the previous case, was that of acute suppuration in the left maxillary antrum of nasal origin, the infection of the cavity occurring in the course of an ordinary severe cold. After cocainisation of the left inferior turbinated and the outer wall of the inferior meatus, the antrum was punctured with the trocar and cannula, and a very copious and thick muco-purulent discharge without odour was washed out. The patient expressed herself as feeling at once better. The bony wall was so thin that she was hardly conscious of the introduction of the trocar. Transillumination was again practised immediately after the evacuation of the pus, and practically no change in the density of the opacity upon the left side was noticeable, in spite of the large quantity of thick secretion which had been removed. This point is of considerable clinical interest in connection with the diagnostic value of transillumination; the opacity in these cases being due to the inflammatory thickening of the lining membrane of the cavity rather than to the purulent collection within it.

Forty-eight hours later the puncture was repeated, and the discharge was found to be very considerably lessened. On the two following days lavage was again carried out, each day showing improvement. The patient was now entirely free of nasal discharge in the intervals, her neuralgic pains had disappeared, and she expressed herself as feeling quite well. A fifth and sixth washing was carried out rather as precautionary measures, no discharge having been seen after the fourth operation. The whole period of treatment was only of one week's duration, and no further trouble has been experienced.

Both these cases illustrate a satisfactory and rapid method of effecting a cure in acute suppuration of the antrum of nasal origin. The advantages of the intra-nasal puncture are that no communication is established between the antrum and the septic buccal cavity, that it avoids the sacrifice of a healthy tooth if none are carious or if there should be no suitable diastema; and, further, the operation can be conveniently performed under cocaine anæsthesia. Sometimes the bony wall is of considerable thickness, and the perforation is not made with the same facility which was met with in these cases. The disadvantage is, of course, the repetition of the puncture, it being impossible to keep so small an opening patent. In recent cases, however, as illustrated by the two just quoted, prolonged treatment may be unnecessary, the condition resolving after three or four washings. Should the suppuration show no sign of improvement after a trial of this kind has been given, it is advisable to make, either through the nose or through the socket of a tooth, a larger and more permanent opening, so that the patient may herself carry out more frequent washing of the cavity, by which the desired result will be obtained.

Case 3 was that of a young woman, who first complained of severe pain in the right upper jaw ten days before she came under examination. The onset was sudden, and was not associated with any catarrhal condition of the nose. There was slight fulness of the soft parts of the cheek, and tenderness on pressure upon the antrum. The acute symptoms continued for two or three days, the pain being sometimes severe; but this gradually subsided, and the patient only complained of slight discharge from the right side of the nose. Examination of the nose revealed a drop of pus in the right middle meatus; but after the head had been held forwards there was no further increase noticed. The right antrum was opaque to illumination, and contrasted with the appearance presented by the left side. The right second upper molar tooth was carious. There was no history of previous trouble with the teeth, with the exception of a diseased condition of the right canine, which had been extracted nearly a year previously.

The short history of ten days with an acute onset of symptoms led me to attempt treatment through the nasal wall of the antrum, as in the two previous cases. The trocar was easily introduced, and a quantity of foul-smelling pus was evacuated. On the three following days the operation was repeated. At the third washing there was no fœtor, the discharge was considerably less in amount and more mucoid in character. At the fourth washing, however, there was again a quantity of purulent secretion. On the following day pus was observed in the middle meatus, and it was evident that a satisfactory result was not to be obtained by this method of treatment. Consequently the diseased tooth was extracted, its socket punctured, and an obturator inserted, so that the patient was able to frequently wash out the cavity. In the course of two months all discharge ceased. There was an old abscess sac at the root of the tooth.

This case differs from the others in two important points. There was no associated nasal catarrh, and the pus from the antrum was foul-smelling. The source of the infection was dental—a fact which was supported by the bacteriological examination of the pus from the sinus, which was kindly made for me by Dr. C. J. Lewis. It contained, in addition to the pneumococcus and staphylococcus aureus, the bacillus mesentericus and bacillus buccalis maximus, the two last-named organisms being associated with dental caries. It was obviously wrong to have attempted treatment by washing through the nose, without having first extracted the carious molar tooth; but I am inclined to think that in this case, even after extraction of the tooth, cure would possibly not have been obtained without more frequent washing of the cavity than daily puncture by the surgeon admitted of. One was inclined to doubt the accuracy of the patient's story regarding the recent onset of her symptoms, but repeated questioning did not elicit any contradictory statements.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Heart Disease and Aneurysm of the Aorta. By Sir WILLIAM H. BROADBENT, Bart., K.C.V.O., and JOHN F. H. BROADBENT, M.A., M.D. (Oxon.). Fourth Edition. London: Baillière, Tindall, & Cox.

ALTHOUGH Sir William Broadbent's name appears on the title-page, we are led to infer from the preface that for the major part of the revision and rearrangement of the fourth edition of this well-known treatise Dr. J. F. H. Broadbent is responsible. While the whole book has been thoroughly revised and brought up to date, we may single out for special mention the new chapters—namely, those on the pulse, on diseases of the coronary arteries, on bradycardia, and on atheroma of the aorta. The description of the methods of examining the pulse is on the whole clear and simple. The phrase "arterial tension" is defined as the strain exerted on the vessel wall by the constant mean blood pressure, by which latter expression is meant the degree of pressure in the vessel after the wave has passed, or, in other words, between the beats. We should prefer to describe this as the minimum blood pressure, in contrast to that during the height of the pulse wave, or maximum blood pressure. The expression "mean" conveys to the mind the idea of an average pressure somewhere between that during the passage of the wave and that in the intervals, and seems to us less accurate than minimum blood pressure. It would certainly be an advantage could the expression "arterial tension" be abolished altogether. Clifford Allbutt's use of the phrase, which Dr. Broadbent justly criticises, shows how indefinite its meaning is. After succinctly discussing the sources of error in the determination of blood pressure by the sphygmanometer, Dr. Broadbent gives (p. 25) as a means of estimating the arterial tension, the pressure which "has to be made by the finger before the flow of blood is arrested and the pulse wave obliterated." But is not this a measure of the maximum blood pressure rather than of the arterial tension? In aortic incompetence, for example, a great deal of force may be required to obliterate the wave, yet here (*pace* Dr. Clifford Allbutt) the tension is low. It is surely more correct to say that the tension (minimum or mean blood pressure) of the pulse may be estimated, either by attempting to roll the vessel under the finger between beats, or, which the student usually finds simpler, by noting the force required to elicit a wave of the greatest amplitude. If much force be needed, the tension is high; if little, the tension is low. The physics of the pulse is notoriously a complicated subject, but, unless we have misunderstood him, in the passage quoted Dr. Broadbent appears to have confounded the maximum and the minimum (or mean) pressure. In the chapter on diseases of the coronary arteries, attention is drawn to the fact that thrombosis of the vessels is a not uncommon, though seldom recognised, cause of death. The chief feature of the section on bradycardia is, as might be anticipated, a description of Stokes-Adams disease, while other forms of infrequent pulse are but briefly mentioned. In this and the other chapters on functional disorders due recognition is given to Gibson's work on the nervous affections of the heart. The account of atheroma contains a good summary of the various pathogenetic theories which are now entertained. We had noted many points throughout the book for mention in this review, but have already overstepped the space at our disposal. We cannot conclude, however, without drawing particular attention to the very valuable suggestions relative to prognosis with which the book abounds. Sir William Broadbent's long experience gives to his matured opinions the greatest weight, and the paragraphs on the subject will well repay the most thoughtful study, for the importance of being able to forecast the progress of a case of cardiac disease is equalled only by the difficulty of the task, and if for nothing else than its value as a guide to this, the book should be in the library of every practitioner. Taking it as a whole, the new edition more than maintains the reputation which its predecessors have won.

International Clinics. Edited by A. O. J. Kelly, M.D.. Vol. I., Series 16. Philadelphia and London: J. B. Lippincott Co.

The sixteenth series of this well-known periodical is inaugurated with a volume of outstanding excellence. Among the articles on medicine the foremost place must be given to a very instructive paper by Dr. Lewis Somers on the different forms of membranous tonsillitis, in which, among others, Vincent's angina, a variety of tonsillitis that has attracted some attention of late, is well depicted and described. Wood alcohol poisoning has recently become very common in America, and Dr. Wood contributes an account of its symptoms, entering a plea for the adoption in the United States of methylating, or rendering untaxed alcohol undrinkable by the addition of wood spirit, as a substitute for the deodorised and purified (and therefore potable) methyl-alcohol which is used in the arts there. Although of average merit, the papers on surgery and treatment call for no special mention. In obstetrics, Dr. De Lees discusses the treatment of eclampsia with reference to rapid delivery. In his concise survey of the subject we think he lays too little stress on the question of eclampsia as a sign of thyroid inadequacy. Dr. Simon contributes a study of eosinophilia in trichinosis, which is singularly elaborate and complete, inasmuch as the author was the patient, and had ample opportunities of observing his own case. The volume concludes with the annual review of progress during 1905, and, as on a previous occasion, we feel bound to single out Dr. Bloodgood's retrospect of surgery as a model well worthy of imitation.

A Treatise on Diagnostic Methods. By Prof. Dr. HERMANN SAHLI, University of Bern. Edited, with additions, by F. P. KINNICUTT, M.D., and N. B. POTTER, M.D. Translation from the Fourth German Edition. Philadelphia and London: W. B. Saunders Company.

ON its first appearance twelve years ago, Sahli's "Lehrbuch der klinischen Untersuchungs-methoden" at once took a place in the foremost rank of works on clinical diagnosis. The reason was not far to seek, for it was not, as so many of its companions are, a more or less successful compilation, but the fruit of the personal experience of an indefatigable worker and student of clinical diagnosis. Professor Sahli has always deliberately chosen to lay his original work before the profession in the pages of successive editions of a text-book, instead of, like the majority of observers, contributing them to journals, and hence the book has an almost unique character. On comparing this translation of the fourth edition with the original German edition of 1894, we find scarcely a paragraph unaltered; the size of the book has nearly doubled; and in the author's preface almost three closely printed pages are occupied by a mere enumeration of the additions and emendations which the new edition contains. It is, of course, quite impossible within reasonable compass to attempt any detailed analysis of so compendious a work. It should, however, be stated that the book is far more than a guide to diagnostic methods, fully as it treats of these, for the author discusses thoroughly and exhaustively the interpretation of clinical phenomena both in their physiological and pathological aspects. He deals with all forms of clinical research—instrumental, case taking, physical examination, chemistry, microscopy, etc.—and the result is probably the most generally useful side-room handbook we possess. The translation has been well done, and the added matter, whether from the pen of the editors or in the form of illustrations and plates, enhances its value. In its English dress we feel sure that "Diagnostic Methods" will be as widely appreciated here as the "Untersuchungs-methoden" is in Germany.

Diseases of the Anus and Rectum. By D. H. GOODSALL, F.R.C.S., and W. ERNEST MILES, F.R.C.S. Part II. London: Longmans, Green, & Co.

AFTER an interval of nearly five years, the second part of this work has appeared. The first chapter deals with prolapse of the rectum, of which the authors recognise two forms—prolapsus mucosæ recti and procidentia recti. The distinction is a useful one, and the descriptions presented are clear and accurate. The weakest part of this chapter is that devoted to treatment. In their preface, it is true, the authors profess only to set forth those methods of treatment which, from personal experience, they have found to yield the most satisfactory results. With this arrangement we have no fault to find; on the contrary, we are anxious to have the results of their extensive experience, but we submit that in a work such as this we are at least entitled to know the grounds on which our authors reject methods of treatment which in the hands of others have proved highly satisfactory. In this and in other sections, for example that on pruritus ani, we fail to find any mention of methods which we constantly employ with satisfaction, and we are left in doubt as to whether the authors have found them wanting or have never given them a trial.

A short but very useful chapter follows on invagination of the rectum, a condition liable to give rise to difficulties of diagnosis, which are clearly described.

Ulceration is fully discussed, special attention being paid to a form of infective ulceration of which the authors apparently saw a good deal at St. Mark's Hospital prior to its being rebuilt in 1895. As this condition appears now to have little more than an historical interest, it seems to receive more than its share of attention, and bacteriological reports dated 1894 seem somewhat belated.

The discussion of malignant disease is comprehensive, judicial, and practical.

The work is fully illustrated, but we scarcely think that the figures are so uniformly successful as those in the first part of the work.

Abdominal Pain: its Causes and Clinical Significance. By A. Ernest Maylard, M.B., B.Sc. (Lond.) London: J. & A. Churchill.

Having long been familiar with Mr. Maylard's work on the surgery of the abdomen, we took up his book on abdominal pain with high expectations, and we have not been disappointed. We do not, of course, find in Mr. Maylard's pages any categorical statement regarding the precise cause and the exact clinical significance of each of the almost infinite variety of painful manifestations met with in abdominal disease. To have expected this would have been to ask too much of the clinician, —and it is as a clinician that Mr. Maylard writes,—and to complain of failing to find it would be unreasonable. The author, indeed, himself anticipates and to a great extent discounts, criticism on these lines, by admitting in his preface "that possibly the weakest part of my effort, and yet the very part that I had, at first, hoped to render the most complete, is that which deals with the regional manifestation of pain and the tabulation of its probable causes." We cannot say we regret that he has given up the attempt to lay down dogmatically the diagnostic significance of every form and site of pain. In the nature of things any such effort must of necessity have been strained and artificial, and it is obviously undesirable that any one symptom, least of all one so purely subjective and depending so much on the personal equation, should have a predominant importance attached to it for diagnostic purposes. This the author has evidently kept in mind, and the result is that we have here a carefully reasoned and well-balanced analysis of pain as *one* symptom of abdominal disease.

An excellent description of the nerve supply of the walls and cavity of the abdomen, and of its contained viscera, serves as a helpful introduction to the more clinical part of the work. We miss, however, any reference to Lennander's important investigations on the sensibility of the peritoneum and the viscera, without which no discussion of the subject of abdominal pain can be complete.

After a short practical chapter on the clinical methods of investigating pain and tenderness, the author takes up each organ individually, and describes the characteristics of the pain produced by the different diseases which affect it. To meet the clinical requirements of such a discussion, a consideration of the pain associated with diseases of such extra-peritoneal organs as the kidney, bladder, and testis, and with affections of the spine and cord, and the lungs and pleura, is included. Regional pain—epigastric, antero-lateral, hypochondriac, lumbar, iliac, dorsal, etc.—is next considered, and tabulated lists of all the conditions which may give rise to any one of these regional pains are given. We confess we find it of little help in seeking for a possible explanation of acute epigastric pain, to read over a list of nearly ninety different affections which may account for it, ranging from acute gastritis, through perforation of the duodenum, volvulus of the small intestine, appendicitis, acute proctitis, pancreatic apoplexy, renal colic, rupture of the uterus, to hysteria and lead colic. These lists are doubtless very complete, but through them we can scarcely see the wood for the trees.

Apart from the lists, the narrative in these sections is extremely good, and bears the imprint of close personal observation and thoughtful study. The subject-matter is presented on the whole in a clear and convincing manner, but here and there we meet with passages the meaning of which is obscure. The first paragraph on p. 58 is an example; the last sentence of the paragraph is so involved and ungrammatical that it fails to convey any meaning. On the next page, we are told that "death from sudden perforation (may) ensue with an entire absence during life of attractive pain." "Attractive" is surely a misprint—unless, of course, it is to be read in association with "during life." A few lines further up, "mitigates" is clearly a misprint for "militates."

We need not refer further to the last ninety pages of the book, which deal with the technique of abdominal surgery and the results of the author's abdominal operations. These matters are not germane to the subject of the work, and were introduced, unwisely we think, as an afterthought.

The Bacteriology of Peritonitis. By Leonard S. Dudgeon, M.R.C.P. (Lond.), and Percy W. G. Sargent, F.R.C.S. London: Archibald Constable & Co. Ltd.

This work, which formed the basis of the Erasmus Wilson Lectures of 1905, embodies the results of a systematic examination of the peritoneum in two hundred and seventy cases operated upon at St. Thomas's Hospital, during a period of about sixteen months. The thorough way in which the investigation has been carried out renders the conclusions arrived at reliable scientifically, and valuable in their practical applications.

It is found that the first organism to make its appearance in the peritoneal cavity is the *Staphylococcus albus*, which was present in almost every variety of peritoneal lesion coming within the scope of the investigation. This organism, fortunately, is of very low virulence, and it appears to serve a protective function by determining the advent of phagocytes. Some interesting experiments are quoted to show that by the simultaneous inoculation of the *Staphylococcus albus* and the colon bacillus, little or no protective action is exerted, but that, if the staphylococcus is given a start of some hours, an artificial immunity is secured. The authors agree with those who hold that in the great majority of cases it is the colon bacillus which determines a fatal issue in cases of peritonitis, although when present the *Streptococcus pyogenes* is the most rapidly fatal organism.

In an interesting chapter on "Intra-peritoneal Hæmorrhage," the results of an investigation of twenty cases are given, and considerable doubt is thrown upon the existence of a chemical form of peritonitis. In every case a white staphylococcus was obtained from the blood clot.

Considerations of space prevent us following the authors through their study of the bacteriology of the various clinical conditions associated with peritonitis, such as diseases of the female pelvic organs, intestinal obstruction, perforation of the hollow viscera, appendicitis, and so on. Suffice it to say that each chapter contains much valuable information, conveyed in a clear and convincing form, and that the investigations here detailed throw considerable light on many clinical points hitherto somewhat obscure.

Chapters xi., xii., and xiii. are devoted to a more minute study of the various organisms met with singly and in combination in different forms of peritonitis; and chapter xiv. deals with the rôle of the phagocytes in peritonitis, the conclusion arrived at being that not only is the small lymphocyte phagocytic, but that the coarsely granular eosinophile cell also possesses phagocytic properties of the very greatest inportance in the early stages of peritoneal infection.

Suggestions for the treatment of acute peritonitis, so far as it is based on its bacteriology, are discussed in the concluding chapter. It is admitted that peritonitis of bacterial origin can subside without operative interference, but this fact in no way justifies delay in operating once the presence of peritonitis is diagnosed. In peritonitis of streptococcal origin, "the most thorough possible washing" of the peritoneal cavity is recommended. In *Bacillus coli* infections the authors believe it is impossible mechanically to cleanse the peritoneum, and that the attempt is attended with the risk of washing away the phagocytes in the exudate, and danger of spreading infection over unaffected regions.

In cases of mild infection, such as gastric perforations and intra-peritoneal hæmorrhage, the washing should be thorough, with a view to removing the foreign material present. The writers are of those who deprecate the use of opium either before or after operation in cases of peritonitis.

We congratulate the authors on having accomplished a piece of highly useful work, and in having succeeded in presenting it in such a readable and convincing manner.

Differential Diagnosis and Treatment of Disease. By AUGUSTUS CAILLÉ, M.D. London: Sidney Appleton.

WE have read this book, a bulky volume of some 850 pages, with much interest. As can be judged from the comprehensive title, the author has attempted to deal with the whole range of medical study. Such a task, comprising the entire fields of general medicine and surgery, gynæcology, and the special subjects, is nowadays beyond the powers of one man; and although Dr. Caillé has made a worthy effort, we fear that he has failed in his endeavour.

The essential object of the book is to be of use to the general practitioner and the senior student. "It should be the aim of every general practitioner to become a good all-round diagnostician, and if he fails in this, let him drift into a specialty." Other *obiter dicta* which catch the eye are: "The treating of symptoms is a delusion and a snare"; "Many death certificates have been written in diphtheria cases because the practitioner waited for a laboratory report before giving antitoxin."

The book is of unequal value. The practitioner and the student will find in it a great deal of useful and practical information, but it is loosely written in parts, and contains many statements which are of doubtful accuracy, and some which, in the present state of our knowledge, are utterly fallacious. The same applies to the illustrations; for although many are excellent, it is necessary in others to add a footnote to explain inaccuracies.

The student must be misled by the statement that the presence of blood in the urine gives "colour from carmine to jet-black, depending upon the amount and upon changes which it may have undergone." The yeast test for sugar as described in the text is valueless; and the author appears to confuse glucose and glycuronic acid. The stools of chorea are said to have a characteristic odour; but we take it that the "alcoholic" stools mentioned twice on page 27 are printer's errors for "acholic."

Quinine, we are told, is of use as an antipyretic only in malarial fever. In any other class of cases it is "useless and often dangerous"; but antipyrin, phenacetin, acetanilide, and like drugs are recommended. Hodgkin's disease "has those changes in the blood of the microcytic form of pernicious anæmia"; the description of leukæmia is meagre and faulty; and the examination error in blood counts in which "a drop" of the mixture is blown upon the counting chamber, without regard to the size of the "drop," may be left to the imagination. On page 45, in splenic anæmia "the leucocytes are reduced in number"; on pape 381 "the leucocytosis is marked."

We are glad to find Dr. Caillé condemn the indiscriminate use of peptonised milk in infant feeding, and we cordially indorse his statements on "teething" on pp. 124, 125. In this country thrush is not "frequently termed sprue"; and few physicians, or for that matter few surgeons, would consider medicinal treatment of tuberculous peritonitis futile, and an early operation indicated in every case. Chorea is described as a "psychomotor neurosis of unknown origin," although in the next paragraph the author states that the most frequent and important variety may be looked upon as an infectious disease or intoxication by the products of pathogenic bacteria.

The section on the digestive system contains statements which—to put it mildly—are hardly in accord with the facts of modern physiology. Thus: "The final product of albumin in the gastro-enteric tract is peptone"; "Starchy food must be changed into absorbable sugar by means of dextrose, which is found in the saliva and pancreas"; in pancreatic secretion, "the nerve supply is probably through the pancreatic, but the mode of action is not definitely known." The specimen diet for chronic dyspepsia contains tea with breakfast, lunch, and dinner. On page 240 we find: "Hunger produces wakefulness. Take crackers, beer, milk, and toddy." In cirrhosis of the liver, "alcohol in moderation is not to be forbidden for those who are accustomed to it."

Such conditions as cysts, hydrocele, hydrosalpinx, hydronephrosis, and hydramnios are included in diseases of the circulatory system. Many causes are given of acute epiphysitis in infants and young children, but syphilis is not one of them.

We fear that, although Dr. Caillé has spent much time and trouble on the book, it is not a work which will meet with general acceptance.

Criminal Responsibility. By Charles Mercier, M.B., F.R.C.P.
Oxford: The Clarendon Press.

Dr. Mercier, in a preface to this book, explains that the subject-matter has previously been fully dealt with by Sir FitzJames Stephen, "a professional lawyer who was in psychology an amateur," and claims his knowledge of psychology as his apology for attempting the task of revision. The point of interest in the book thus becomes the comparison of the findings of the lawyer with an amateur knowledge of psychology with those of a psychologist with an amateur knowledge of law.

The lawyer's opinions as to criminal responsibility of the insane may be summed up thus: A person afflicted with insanity is irresponsible if he does not know the nature and quality of the act, or has not the power of controlling his own conduct. The psychologist suggests that such guiding principles should be very materially altered. In the first place, he suggests that insanities should be divided into three classes—"ordinary" insanity, moral insanity, and moral imbecility; the first practically corresponding to the class of case dealt with by the lawyer, the latter two being additions. In the second place, the psychologist suggests that the conception of the influence of ordinary insanity on responsibility should be changed. The first suggestion, the division of insanities into three classes, is so hypothetical and argumentative, that the reader will naturally turn to the pages of the book to find if the author can advance facts to warrant the far-reaching change. If he does so he will be disappointed, for the author is apparently unable to bring his views on the matter outside the region of pure theory and hypothesis. He fails to give good reason why the lawyer's views should be amended in that direction. The psychologist's other suggestions deal with cases of "ordinary insanity." They agree with the lawyer's in so far as want of knowledge of the nature and quality of the act frees the sufferer from responsibility, but disagree in at least three respects, the one being the addition of two provisos "that the knowledge includes knowledge and appreciation of the circumstances in which the act was done" and "that knowledge is a matter of degree," the second being an acknowledgment of partial responsibility of the insane, and the third the withdrawal of freedom from responsibility when the insanity is such as to prevent the sufferer from controlling his actions. It is as difficult to understand the meaning of the two provisos as it is to see under what circumstances they can be of any practical use; and, like the psychologist's classification of insanity quoted above, these provisos are based on unsubstantiated theory, and, like them, for practical purposes are objectionable and not desirable additions. The psychologist's views as to partial responsibility of the insane are contradictory. He upholds that theory, stating emphatically that the majority of insane persons are sane in a considerable proportion of their conduct, and responsible for what they do in that part of their conduct; but in his arguments he emphasises the impossibility of measuring the amount of the insanity by the extent of the symptoms. For instance, the psychologist states on page 189: "The facts that a man stammers, and that the pupils of his eyes are of different sizes, are in themselves no excuse for crime; but they may be symptoms of general paralysis of the insane, which is one of the most fatal forms of the disease. Why should not the existence of a delusion be as significant as the existence of a stammer?" When the author allows that a delusion is nothing more than an evidence of disease of the brain, and not a measure of it, it is difficult to understand on what principles he can use the nature of delusions, or the extent of delusions, as a measure of insane areas of conduct or of the amount of responsibility. The third difference, the omission of the acknowledgment of insane impulse as a ground of responsibility, to the medical reader is nothing short of surprising, for the merest tyro in mental diseases knows of the existence of a well-marked form of insanity, paranoia, in which the intellect is clear, but in which there exists delusions such as may, and can, dominate the sufferer's conduct. The lawyer made allowance for that condition, but the psychologist does not do so; the physician will adhere to the lawyer's views on this point rather than adopt those of the psychologist. In the book there are no good arguments warranting such a far-reaching and cruel conclusion as to hold an insane person responsible for what he does under the impulsion of delusion.

Thus, after a scrutiny of the book, the reader will fail to find that the review of the lawyer's work by the psychologist has been of practical use in defining the line where the responsibility of the insane ends and where the irresponsibility of the insane commences, and will fail to find any clearer or more useful conclusions than were advanced by the lawyer. The book is one which may appeal to psychologists, but it is not one likely to be appreciated either by physicians or by lawyers.

Whatever the faults of the book are, Dr. Mercier is to be congratulated on its style. It is most readable and most interesting, and is written with a fluency that is not common in medical literature.

Pathology: General and Special. By R. T. HEWLETT, M.D. London: J. & A. Churchill.

THIS book is an attempt to give in a brief space an account of the most important pathological processes, and to supply to the average student of medicine all the general and special pathology which he will require in his after career as a general medical practitioner. Such a book will be welcomed by a great number, not only of students, but also of qualified practitioners, and we congratulate Dr. Hewlett on his latest contribution to medical literature.

The book is very well written; it is very readable, and the general arrangement of the various subjects is, on the whole, quite satisfactory. Certain of the subjects, however, do not seem to us to have received sufficient attention. Inflammation and repair—that foundation on which so much special pathological anatomy is built—have, we think, been treated very imperfectly. Some of the most important processes are merely mentioned, while others of trivial importance are fully described. We do not consider it sufficient to speak of the emigration of "leucocytes" without any reference even to the nature of these migratory cells. Repair occupies about half a page, while almost as much space is devoted to the "plasma cell." In the chapter on diseases of the kidney we find hardly a reference to some of the most important and most frequently occurring pathological changes, *e.g.* the glomerular changes in the subacute forms of nephritis.

On pulmonary tuberculosis the writer is very brief, and we certainly do not agree that only in rare instances the infection seems to be propagated by the lymphatics.

The brevity in these and other subjects may be defended on the ground that the material had to be compressed within certain limits, but we think this might have been done with advantage by the omission of such physiological problems as fever, pyrexia, shock, and collapse.

Though we consider these defects serious in a book claiming so much as this one does, yet much of the material is so good and so well abreast of modern work, *e.g.* the chapters on progressive and retrogressive changes and on neoplasms, that we consider Dr. Hewlett's book a very valuable contribution, and it will be a very great help to students and teachers of pathology.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Recent Work on the Superficial Reflexes.

The *abdominal reflex* has to a great extent been neglected as of inconstant occurrence in healthy persons, and therefore of little clinical importance. Recent work, however, tends to show that it deserves more attention than it has hitherto received at the hands of most observers. Its physiology and pathology are discussed by Muller and Seidelmann (*München. med. Wchnschr.*, 1905, July 11). In 1000 healthy males (soldiers) whom they examined, the reflex was absent only once. Absence of the reflex is therefore a pathological occurrence, and its cause should be sought in disease of the *nervous system* or *abdominal viscera.* Unilateral abolition of the reflex occurs in hemiplegia, whether cerebral or spinal. Its only localising significance is that it shows that the lesion is above the eighth to twelfth dorsal segments; its chief diagnostic value is during the comatose stage of a cerebral hæmorrhage, when it is often difficult to determine which side of the body is paralysed. In cerebral hæmorrhage the reflex is not only abolished early, but its return is long delayed; this may lead to the detection of previous hemiplegia in a patient who has completely recovered in almost every other respect. Bilateral absence of the abdominal reflex is an important early sign of multiple sclerosis; it is usually present in the initial stages of the disease when other signs are few. Absence of the reflex assists in the diagnosis as between this malady and the early stage of lateral sclerosis, in which it is retained. When from any cause (*e.g.* meningitis, lead colic) there is considerable tonic contraction of the abdominal muscles, it may be impossible to elicit the reflex, and patients can also inhibit the reflex by voluntary contraction of the abdominal wall. In tabes the reflex is normal or exaggerated, unless there is widespread anæsthesia of the skin of the abdomen. Hysterical anæsthesia, however, does not abolish the reflex unless there is at the same time tonic contraction of the muscles. As regards the effect of disease of the abdominal organs on the reflex, the general statement may be made that any diffused or local lesion which increases the tone of the abdominal musculature diminishes or abolishes the corresponding reflex. The division of the reflex into supra and infra umbilical is more important as regards abdominal than as regards nervous diseases. Active retraction of the abdomen in painful affections, such as colic, temporarily abolishes the reflex. General distension of the abdomen from chronic, comparatively painless disease does not affect the reflexes; if, however, it comes on acutely and is attended by pain, the reflexes vanish. The same applies to local lesions, a typical instance being acute appendicitis, in which unilateral abolition of the abdominal reflex is almost invariable. Practically, the reflex is absent in abdominal diseases when there is the slightest spastic contraction ("increased resistance") of one or more segments of the abdominal parietes.

Rolleston (*Brain*, London, 1906, No. 113) discusses the *abdominal reflex in typhoid fever*. He confirms the statement that it is practically constant in healthy persons up to the age of 50, and that its absence (Rosenbach's sign) suggests either disease of the nervous system or an acute abdominal infection. He has investigated the condition of matters in sixty cases notified as typhoid; in fifteen of these the diagnosis was erroneous. For practical purposes it is best to divide the reflex into supra and infra umbilical. In typhoid the latter is the first to disappear and the last to return; the former may remain present, though more or less enfeebled, throughout the whole course of the disease. Of the fifteen cases which did not turn out to be typhoid, the abdominal reflex was present in all save three—suppurative appendicitis, acute cancerous peritonitis, and an aged woman whose relaxed abdominal walls precluded any inference being drawn. The reflex was not affected in the cases of extra-abdominal or chronic abdominal lesion. In the forty-five enteric cases the reflex was affected to a varying degree in forty-two (93·3 per cent.), and completely in abeyance in thirty-one (68·8 per cent.). The abdominal reflex is thus more frequently implicated in typhoid fever than are the tendon jerks in diseases (*e.g.* diphtheria) associated with peripheral neuritis; it therefore has a better claim to rank in the semeiology of typhoid than has abolition of the knee-jerk in diphtheria. The abolition of the reflex in typhoid is, however, of shorter duration than that of the knee-jerk in diphtheria, which, once lost, may not return for months. In the majority of cases of typhoid the abdominal reflexes resume normal activity as soon as convalescence becomes established. Sometimes the reflex is unduly brisk in the early stage of the fever. Pyrexia, *per se*, does not affect the reflex, since it persists throughout the course of other fevers and their complications. The reappearance of a lost reflex in the course of typhoid often coincides with improvement in the nature of the stools and with the commencement of lysis. Persistent absence of the reflex in spite of defervescence in a patient under 50, suggests that relapse is imminent. In genuine relapses the reflex again disappears, while in recrudescence of pyrexia from other causes it remains unimpaired. A striking concomitant of abolition of the reflexes is a blunting of the normal ticklishness, which returns to normal as the patient becomes convalescent. In most cases in which the abdominal reflexes were affected the deep reflexes were also impaired; there is not, therefore, that striking antagonism between the superficial and deep reflexes which obtains in organic nervous diseases, notably in hemiplegia, spastic paralysis, and disseminated sclerosis. Ankle clonus was not rare; it was met with in association with absent knee and ankle jerk in some cases, and with both presence and absence of the abdominal reflexes. Babinski's sign was present in four patients. The reflex under consideration is ill developed in young children and in persons over 50; between these extremes it can nearly always be elicited. Why the reflex should be affected in typhoid and analogous conditions is obscure; the frequent association of its enfeeblement with ankle clonus, or, less commonly, with an extensor response, suggests a perturbation of the pyramidal tracts. The best way to elicit the phenomenon is to stroke the skin of the abdomen with a penholder while the patient's attention is distracted. (Jendrassik's manœuvre should not be employed for this purpose; it heightens the tone of the abdominal muscles.) The muscles must be relaxed; a single negative result is of no value. Among Rolleston's conclusions are: The absence of the abdominal reflex in a patient under 50 is confined to nervous disease and certain acute abdominal conditions, notably typhoid and appendicitis, hence is of considerable diagnostic value in cases of continued pyrexia. The frequency, degree, and duration of impairment are, as a rule, directly proportional to the age, return to normal taking place sooner in young than in old persons.

The plantar reflex in children.—Engstler (*Wien. klin. Wchnschr.*, 1905, No. 22) has examined the plantar reflexes in 1000 children, with the object of settling the disputed point as to when the extensor response normal to infancy is translated into the flexor reflex of adult life. On stroking the sole of a child's foot, we may get—(1) Typical extensor response; (2) typical flexor response; (3) no reflex: (4) dorsal flexion of the great toe and plantar flexion of the smaller toes; (5) plantar flexion of the small toes only, the great toe remaining motionless. In some individuals the reflex is inconstantly present, but there is never alternation of flexor and extensor response. Sometimes the stimulus causes the whole limb to move; in these cases there is generally an extensor response. The response is of the same character during sleep and when awake, but is usually more evident during sleep. In newly born and premature children dorsiflexion (1) and (4) is the almost invariable rule; in the third year plantar flexion (2) and (5) is equally constant. During the course of the first and second years the relative frequency of dorsal flexion, as compared with plantar flexion, diminishes with steady uniformity, the two occurring with almost equal frequency between the sixth and eighteenth months. During this transitional period the reflex is often altogether absent. Babinski's sign has therefore no pathological significance until after the second year. In reference to the question whether the development of the adult response is related to the period at which the power of walking is required, Engstler found that many children who could not yet walk showed the flexor response. In bad rickets the tendency was for the date of transmutation of the one type of reflex into the other to be postponed, but not for nearly so long as the power of walking is. Probably, therefore, rickets checks the appearance of the adult type of reflex rather through its general retarding influence on development than by delaying walking.

A new method of eliciting the extensor plantar response.—White

(*Med. Rec.*, N.Y., 1905, July 5) finds that in many cases of disease of the pyramidal tracts extension of the great toe follows stroking the inner side of the front of the thigh. He refers to Oppenheim's previous observation that, under pathological conditions, a reflex movement of the feet and toes, analogous to Babinski's sign, can be produced by scratching the inner side of the leg, and to Gordon's "new paradox flexor response" (*vide infra*), and points out that stimuli applied to the skin area subserved by the second lumbar to first sacral segments may, under pathological conditions, cause a reflex movement of which the specific feature is extension of the great toe from contraction of the extensor longus hallucis. This muscle is represented in the fifth lumbar segment, hence from any of the above-mentioned five segments impulses must be able to reach this—as is in consonance with the histological pictures of centripetal neurones in preparations stained by Golgi and Marchi methods. The *paradox flexor reflex* was described by Gordon (*Am. Med.*, Phila., 1904, December 3) as a reflex extension of the great toe produced by deep pressure on the middle and lower part of the calf muscles, the examiner standing on the outer side of the patient's leg, which must be relaxed, and the feet slightly rotated outwards. This new reflex never occurs in health, but only in nervous disease, particularly of the motor tracts; it sometimes accompanies, more frequently replaces, Babinski's sign, and is often associated with increased knee-jerk. It was found in twelve cases of hemiplegia to be most evident on the unaffected side.

Appearance of Babinski's sign after scopolamine injections.—Since the introduction of scopolamine-morphine narcosis the administration of the former drug has become much more frequent. Link (*Ztschr. f. klin. Med.*, Berlin, 1906, Bd. lix. Heft 2–4) finds that in almost all cases, very soon (two minutes to a quarter of an hour) after a medicinal dose of scopolamine, an extensor replaces the normal flexor response, and endures for a number of hours. Babinski's sign does not follow morphine injections even when the dose is toxic, nor does it occur in general narcosis. The response which follows the administration is not associated with exaggeration of the tendon reflexes. After discussing the nature of the plantar reflex and Babinski's phenomenon, Link concludes that the reason why an extensor response follows scopolamine is that the cortical function is temporarily abrogated.

Reflexes associated with the fifth nerve.—Certain ocular reflexes and their significance are considered in a paper by Kempner (*Berl. klin. Wchnschr.*, 1906, March 26, April 2). Among the ocular reflexes in which the trigeminus takes part are—(1) Reflex winking when cornea or conjunctiva is touched; (2) the corneo-mandibular reflex, a contraction of the homolateral internal pterygoid muscle when the cornea is touched, moving the jaw to the opposite side; (3) lachrymation and vascularisation of the eye on irritating the conjunctiva. In exact observations one must avoid—(1) Exhausting the reflex by repeated stimuli; (2) touching the pupillary area in testing the corneal reflex; and (3) the fallacy of the patient voluntarily inhibiting movement. The reflexes were tested by gently drawing a smooth rounded glass point from the conjunctival to the corneal surface. Anomalies were found in fifty-five out of 350 cases of organic, and twenty-seven out of 400 cases of functional nervous disease. The following abnormalities of the reflexes were noted:—Complete (1) unilateral or (2) bilateral abolition of winking, either (*a*) without, or (*b*) with, affection of sensibility. Partial (3) unilateral or (4) bilateral diminution of the reflex, (*a*) without, or (*b*) with, affection of sensibility. (5) Sensory affection, without interference with the reflexes. After discussing the individual cases in which these variations occurred, the following conclusions are drawn:—The normal reflex being bilateral when one eye is touched, if the centripetal part of the arc is interrupted the reflex is bilaterally abolished, whereas if the break is in the motor part (*e.g.* facial paralysis), blinking still occurs in the opposite eye. In organic disease the affection of the reflex is usually unilateral, associated with involvement of sensation, and progressive. In functional disease the affection of the reflex is usually bilateral, disturbance of sensibility as a rule is absent, and the condition is not progressive, but variable from day to day. The amount of abnormality is the same in functional as organic maladies. The corneomandibular reflex was present in only 2 per cent. of the patients, and is of no practical importance.

SURGERY.

UNDER THE CHARGE OF

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Affections of the Thyroid Gland.

An interesting and instructive study of affections of the thyroid gland, based upon the results of an examination of the specimens removed from sixty-one cases, is published by G. E. Beilby of Albany, N.Y. (*Ann. Surg.*, Phila., 1906, June).

Of these cases twenty-six were examples of simple hypertrophy (colloid hypertrophy), in which there is a symmetrical increase in size of the entire gland, extending over many years. Histologically, there is a characteristic dilatation of the thyroid vesicles, due to increased colloid secretion. The stroma is scanty, but definite lobulation can always be made out. The secondary changes met with were hæmorrhage into the alveoli with degeneration and pigmentation, and calcification. Cysts of large size were not met with in this variety of enlargement.

In one-half of the cases the condition occurred in youth or early adult life, and in a few, pregnancy appeared to be an exciting cause. There were no symptoms beyond those resulting from pressure. When the swelling was of extreme size, there were circulatory disturbances, and vertigo was frequently present, due apparently to pressure of the enlarged gland on the blood vessels of the neck.

The condition may end by a subsidence of the active secretory process, with return of the gland to its natural size; the enlargement may become permanent; or a rapid increase may suddenly take place.

There were nine cases of adenoma, the tumours forming solid, nonmalignant, encapsulated growths. They are usually single, and may occur within the tissue of the gland, outside the gland but attached to its capsule, or at some distance from the thyroid. Clinically, an adenoma is hard and firm, freely movable, and it gives rise to no symptoms apart from those of pressure. They occur during youth or early adult life (16 to 35), and are of slow growth. Two distinct varieties are recognised, both definitely encapsulated, smooth, and, as a rule, soft. The pure adenoma is composed of closely packed epithelial vesicles, containing little or no colloid material, and a very small amount of connective tissue. In the colloid adenoma, the epithelial vesicles are dilated and filled with colloid material. The author emphasises his belief that a large percentage of cysts of the thyroid have their origin in adenomata. Cysts in thyroids which have undergone simple hypertrophy, on the other hand, are very rare.

Three cases of recurrent adenoma were met with. While not definitely malignant, they differed in certain respects from the solitary adenoma. All the patients were over forty years of age.

Of cyst of the thyroid, of which the author recognises three varieties—simple, hæmorrhagic, and adenomatous—there were twelve cases. The simple form has a thin wall, composed of condensed thyroid tissue, and it contains a mixture of blood and colloid. These cysts occur in glands otherwise apparently normal.

There was only one hæmorrhagic cyst, and the author thinks it is perhaps unique. It occurred in a man, æt. 41, who, eight years before, had fallen down a stair backwards, and immediately thereafter noticed a swelling in the right side of the thyroid region. The microscopic diagnosis was "hæmorrhagic cyst with chronic thyroiditis, hæmorrhage, and necrosis."

Adenomatous cysts, of which there were ten cases, result in the majority of cases from degeneration of colloid adenomata. Cholesterin crystals were found in the fluid of these cysts. They seem to begin as encapsulated adenomata composed of cells which present no colloid secretion. As growth continues, colloid material is secreted, the colloid vesicles coalesce, and hæmorrhage occurs into the cavity. As the pressure increases, the adenomatous tissue undergoes atrophy and the cyst is thus formed.

Only one case of metastatic tumour of the thyroid was met with, and it implicated the antrum of Highmore, occluding the right nostril and bulging the right eyeball. Like other cases that have been recorded, the tumour, although histologically innocent, was clinically malignant. The metastasis usually occurs in bone.

All the six examples of exophthalmic goitre investigated occurred in females. The author points out that two forms of exophthalmic goitre may be recognised: one beginning in an apparently normal gland and progressing symmetrically, but never attaining a great size. Exophthalmos, tachycardia, and tremors are invariably present, and the disease, if untreated, is fatal in from one to three years. In the other form the exophthalmic process is associated with some other type of thyroid affection, such as simple colloid hypertrophy. The disease is of longer duration, the thyroid swelling attains a greater size, and the symptoms are less severe. In exophthalmic goitre the histological changes closely resemble the compensatory hypertrophy which is seen in the remaining portion of the thyroid gland after its partial excision. Nothing is yet definitely established regarding the pathogenesis of this affection. The majority believe that it has its basis in an abnormal condition of the gland itself, and that the disease is a manifestation of an excessive or perverted secretion of the thyroid epithelium.

The other conditions included in the author's series were—Chronic thyroiditis (one case); tuberculosis (two cases); carcinoma (one case). No case of primary sarcoma was observed.

The author remarks: "When we bear in mind that the symmetrical enlargement of the thyroid gland indicates a hypertrophy, and the asymmetrical a tumour or a cyst, we have gone a great way towards making a diagnosis." He confines the term "goitre" to the hypertrophies—"simple" and "exophthalmic." The diagnosis between these two forms is seldom difficult. In the exophthalmic variety the subjective symptoms are definite and constant; the condition very seldom begins before the age of twenty; the progress of the disease is comparatively rapid. In the simple hypertrophy there are no subjective symptoms beyond those resulting from pressure; the enlargement is usually much greater, and the condition in a large proportion of cases begins before the age of twenty. The author believes that it practically never originates later than the twenty-fifth year. Further, its duration is much longer, often extending to twenty or thirty years.

It is not always easy to differentiate between an adenoma and a cyst. The cysts are more apt to be smooth and ovoid, while definite lobulations can often be made out in the adenomata. Variation in the size of the swelling seems to be frequent in cysts.

Carcinoma occurs at a later age than the other tumours; it may not form a large swelling, but it rapidly infiltrates the gland and the surrounding tissues, and dyspnœa, dysphagia, and changes in the voice are early and marked symptoms.

The author is in favour of operation in the majority of thyroid affections. For exophthalmic goitre he agrees with the prevalent opinion that the most satisfactory results are to be obtained by partial thyroidectomy, but the operation must be done early before the disease has affected the nervous system.

Muco-membranous Typhlo-colitis mistaken for Appendicitis.

Few physicians have done more to place the operative treatment of appendicitis on a sound footing than Dieulafoy, and it behoves surgeons to listen when he utters a warning that they are going too fast. This he does in the paper before us (*Bull. Acad. de méd.*, Paris, 1906, May), in which he refers to the number of people suffering merely from mucomembraneous typhlo-colitis who are needlessly operated upon "for an appendicitis which does not exist." He quotes in illustration a dozen cases in which the patients, after having had the appendix removed, continued to suffer from attacks just as they did before. In these patients the symptoms referrable to the cæcal portion of the intestine predominate, the pain is most severe in the right iliac fossa, and as the attacks are repeated at intervals, a diagnosis of appendicitis is arrived at and the operation performed. On opening the abdomen the appendix is found, to all appearance, healthy, but it is removed and submitted to microscopic examination, when the situation is saved by the discovery of minute lesions, which constitute what the author ironically describes as "histological appendicitis." These lesions, which take the form of "fibrous bands," "hypertrophy of the follicles," and "hæmorrhagic folliculitis," Dieulafoy believes, will be found in any appendix removed from an adult; the so-called hæmorrhagic folliculitis, he thinks, is produced by the surgeon in the course of the operation. In support of this view, M. Letulle is quoted to the effect that he has never met with hæmorrhagic folliculitis except in appendices removed by operation, and that these lesions are produced by the ligature tied round the appendix prior to its removal. The patients recover from the operation, but sooner or later all the symptoms return: "nothing is remedied, nothing modified; all that they have is a scar on the belly." As the author puts it, "on their belly is inscribed in indelible characters the mistaken diagnosis." Dieulafoy contests the opinion that appendicitis frequently results from typhlo-colitis; and he supports the view of Potain, that "the coexistence of a true appendicitis and a typhlo-colitis is exceptionally rare." It is only fair to add that in the discussion which followed M. Dieulafoy's paper, some of his conclusions were destructively criticised, without, however, in our opinion, affecting his main contention.

Dislocation of the Carpal Semilunar Bone.

The use of the X-rays has shown that dislocation of the individual bones of the carpus is less rare than was previously supposed. Thébault (*Arch. gén. de méd.*, Paris, 1906, June 12) has studied several cases of dorsal dislocation of the carpal semilunar occurring in the course of manual work, an injury which he believes to be comparatively common. Soon after the accident the lesion is easily diagnosed with or without the X-rays. The dislocation may occur alone or may be complicated with other dislocations or with fractures of adjacent bones. If reduced at once, the prognosis is favourable, but if there is delay the usefulness of the wrist may be impaired. The treatment consists in replacing the bone, with the aid of an anæsthetic if necessary. It is sometimes necessary to excise the displaced bone.

OBSTETRICS AND GYNÆCOLOGY.

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Premenstrual Elevations of Temperature.

Riebold (*Deutsche med. Wchnschr.*, Leipzig, 1906, April) made observations on 2000 patients who were under hospital treatment on an average for thirty days. Only such cases were included in which there was an elevation of temperature of at least 0·5 C. on one of the three days preceding the period, or on the first day of the period, without there being any discoverable reason for the fever. The temperatures of the patients were taken for at least six days previous to this premenstrual period, and the maximum temperature of this time was taken as the basis for estimating the elevation. Eighty-five cases were noted in which fever occurred. Most of the cases were phthisical. The author believes that such fever is never observed in entirely healthy women, and that when it does occur it indicates an irritation of some latent disease focus.

The cessation of a previously existing tendency to premenstrual fever is to be regarded as a favourable sign in pulmonary tuberculosis, whereas it is a distinctly unfavourable sign if the symptom appears in any severity in the course of tuberculosis.

DANGERS OF VENTRO-FIXATION.

CALMAN (*Centralbl. f. Gynäk.*, Leipzig, 1906, February) describes a case of twin pregnancy after this operation, where natural delivery was impossible. After ventro-fixation, patient had pain and hæmorrhage, was curetted, and during pregnancy complained of backache and weight in the abdomen. The right round ligament was stretched and distinctly felt. Neither fœtus became engaged in the pelvis. The posterior lip of the cervix was drawn up above the promontory. Both children were delivered by version. The right side of the uterus was much stretched, while the left took almost no part in forming the cavity for the fœtus. The author questions the justification of such fixation operations.

USE OF SCOPOLAMINE IN ECLAMPSIA.

LAURENDEAU (*Journ. de méd. chir. et pharm., etc.*, Paris, 1906, April 14) recommends hypodermic injections of the hydro-bromide in doses of $\frac{1}{50}$ of a grain combined with $\frac{1}{5}$ gr. of morphia and 15 drops of the fluid extract of veratrum viride. The dose may be repeated in an hour and a half. He describes two cases so treated. In the first, convulsions began after labour was completed. In the second case the convulsions were of unusual severity, but ceased entirely seven hours after the injections were commenced. Two days later the labour terminated normally. Laurendeau states that scopolamine acts as a nerve sedative, while veratrum lowers the arterial tension.

ETIOLOGY OF FATAL POST-PARTUM ATONY.

MARTIN (*Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1906, February) describes a case which he believes was the result of an endometritis and metritis existing before pregnancy began. The patient had been delivered twice. During the pregnancy in question she had lost blood for seven weeks. Four days after the onset of labour there was a bad-smelling discharge from the uterus, with rise of temperature. The placenta was adherent to the uterine wall. No contraction of the uterus could be brought about by ergot, massage, or hot douches. The patient succumbed to hæmorrhage. The post-mortem showed the uterus to be quite uncontracted, and the placenta could not be separated from the uterine wall. Microscopic examination showed that there was present chronic metritis with destruction of muscle fibres, and hyaline degeneration of the placenta. The author thinks that the atony began in the previous labour, and resulted from an insufficiency of the uterine muscle.

THE RETURN OF MENSTRUATION AFTER ABORTION.

ENGLANDER (*Centralbl. f. Gynäk.*, Leipzig, 1906, February 17) examined fifty-seven cases with a view of ascertaining the time of the return of normal menstruation. In thirty-six cases menstruation occurred in four weeks after the abortion, in eight cases in the fifth week, in six at the end of five weeks, in two at the sixth week, in four after six weeks. Four weeks, therefore, seems to be the usual time for the return of menstruation. The uterine mucous membrane returns more quickly to its normal function after abortion than after labour. When irregular bleeding occurs after abortion, this should not be considered as a normal menstruation, but more probably as the result of retained membranes.

SIGNIFICANCE OF HIGH TEMPERATURE WITH SLOW PULSE IN THE PUERPERIUM.

MERLETTI (*Riforma med.*, Roma, 1906, March 17), from a study of about 1000 cases during the puerperium, concludes that a high temperature with slow pulse cannot be ascribed to genital infection. Such febrile symptoms are due to intercurrent diseases, gastro-intestinal disturbances, anomalies of lactation, or lochia or nervous conditions. In cases of true infection of the genital organs, the pulse rises in proportion to the temperature. This occurs whether the infection is severe or only slight in nature, and in whatever part of the genital tract the infection takes place.

RADICAL OPERATION FOR CANCER.

CLARK (*Univ. Penn. Med. Bull.*, Phila., June) finds that results following radical operations for cancer of the uterus show little to favour the extensive dissection of glands, with the largely increased mortality that must necessarily follow this operation from shock and infection. More is lost than gained by the radical operation. Clark removes all possible tissue in the vicinity of the primary growth, using the cautery in preference to the knife, and not unduly prolonging the operation by a search for glands.

HÆMATOMA OF THE OVARY.

SAVAGE (*Birmingham Med. Rev.*, 1906, May) states that this condition occurs in the first half of menstrual life, tends to be bilateral, and not to be associated with gonorrhœa or tuberculosis. It may be caused by septic infection, but further evidence on this point is required. The onset may be acute, but the pain becomes chronic, and is located in the lower abdomen. Menstruation may not be affected. The ovary is disorganised. Broad adhesions to surrounding parts are always present, being an indication of inflammation. The Fallopian tubes frequently show gross changes. Savage divides this disease into two classes—hæmatoma of the Graafian follicle, and hæmatoma of the corpus luteum. The first class results from multiple and premature ripening of Graafian follicles, due to an increased amount of blood in the ovary. Class 2 is due to hæmorrhage occurring during the retrogression of the Graafian follicle.

THERAPEUTICS.

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The Dietetic Treatment of Exophthalmic Goitre.

Konrad Alt has an interesting paper in the *München. med. Wchnschr.* of June 12, 1906. In it he discusses the dietetic treatment of Graves' disease, and places upon record a number of cases which have benefited to an extraordinary extent from a proper diet. His investigation started from the point of view that in this disease the metabolism of the body is abnormal. There is frequently glycosuria, œdema, and emaciation. On a more detailed examination of the excretions, he found that exophthalmic patients suffer from inadequate renal excretion. Thus salt is not excreted well, and the accumulation in the tissues leads to œdema. He treated several patients with a milk diet poor in chlorides, and found that there was loss of weight along with disappearance of the œdema. When the accumulated chlorides were excreted, and the patients became in chloride equilibrium, the general symptoms as a rule showed distinct improvement. The pulse rate fell, and the circumference of the neck became smaller, while the motor restlessness and mental excitement diminished. The power of utilising carbohydrates was seriously impaired in all the patients, with one exception. Thus the exhibition of 300 grms. of a diet relatively poor in carbohydrates was followed by the appearance of reducing bodies in the urine, while the single administration of 80 grms. of dextrose, lævulose, or milk sugar was followed by the excretion of these substances in the urine. On the other hand, the calory requirement of such patients is extremely high, and in several instances was two or three times that of a healthy individual. The intestinal utilisation of such a diet was extremely good even in a couple of cases, where the bowels moved three or four times in the day. From this observation the construction of a suitable diet was readily effected. To meet the renal inadequacy, the salt ration was restricted to 1 drm. in the day, along with restrictions in the consumption of water. The amount of carbohydrates was kept within the limit which it was found each case could utilise, while the calory requirement was made up by giving large quantities of albumin and fat in the form of milk, cream, and fresh butter. Under an individualised diet of this type, in almost all the cases it was possible to obtain a distinct increase in weight, due to tissue increase, and not to accumulation of fluid. Along with this gain in weight there was marked improvement in the general health. The symptoms of the disease disappeared, and the individual organs became more efficient, so that the diet could gradually be increased in those elements which at first the patients were unable to assimilate. The article is illustrated by a series of photographs, which show well the improvement gained by administering a diet constructed with due regard to the metabolic requirements of the patients. Alt suggests that it may prove profitable to investigate the metabolism in other nervous conditions, as we may too readily have ascribed the disturbances to hereditary weakness of the nervous system, when in reality we may only have to deal with a weakness on the part of an individual organ, which by a process of auto-intoxication may have damaged the nervous system. In such a case, the proper treatment may consist in relieving the organ in question of excessive strain by constructing a suitable diet.

The Metabolism in Leukæmia during Treatment with X-Rays.

Rosenstern has studied the excretion of uric acid during treatment with X-rays to determine whether the rays act by destroying circulating white cells, or whether the action is upon the tissues which produce the white cells. At first the exposure of the spleen to the rays leads to an increase in the output of uric acid in the urine, but this gradually falls as the number of leucocytes diminish in the blood. In those cases in which the blood becomes normal, the urinary excretion of uric acid shows a very distinct decrease compared with the figures obtained at the commencement of treatment. He concludes, therefore, that as the nuclei of dying cells are the chief factors which give rise to uric acid, the reduction in the number of white cells circulating in the blood at the end of effective treatment is not due simply to an increased destruction of the cells, but is due to an absolute diminution in production of white cells. This diminished production seems to be due to an action of the rays upon those tissue elements which produce the white cells. How this alteration comes on he is unable to state. It may either result from a direct action upon the leucoblastic formative tissues, or may be indirectly due to the production of a leucotoxin circulating in the blood. In one of his cases during the treatment a fall in erythrocytes and hæmoglobin parallel to the diminution of whites occurred along with loss of strength and continued high output of uric acid. This finding illustrates one of the dangers of ray treatment of leukæmia. The exposure was too great, and there was not only reduction in the number of white but also red cells were affected. He insists that it is necessary during the treatment to watch the course of the hæmoglobin, red cells, and output of uric acid. When the uric acid output remains high despite the gradual fall to normal of white cells, this should be read as an indication that great destruction of cells rather than diminished production is causing the fall, and the rays in such circumstances must be used with great caution.—*München. med. Wchnschr.*, 1906, Nos. 21 and 22.

X-Rays in Psoriasis and Eczema.

Schmidt points out that in certain chronic forms of psoriasis, treatment with X-rays gives rapid relief in cases where other methods of treatment have proved useless. To obtain the beneficial action, it is unnecessary to produce any marked reaction in healthy skin areas. In fact, in psoriasis special care is necessary, as an erythematous reaction is frequently followed by a fresh outbreak of the eruption. The same thing is noted in chronic eczema, so that both conditions should be treated at the commencement with a very small initial dose, say, one-third the amount required to produce an erythema. If at the end of eight days no distinct improvement is observed, the initial dose may be doubled. The course of events is as follows in psoriasis. After a successful exposure, the shedding of the scales ceases in a few days; the patches subside, and infiltration disappears, and at the end of ten days the patches are healed, leaving behind pigmented areas, which pigmentation fades in the course of eight to fourteen days. In a few exceptional cases the pigmentation persists for a longer period. The healthy skin should show no reaction of any kind. The method should not be used in cases of psoriasis of the head. It is specially applicable for isolated, inveterate plagues, for psoriasis of the hands, and large diffuse infiltrated areas. Special care is required, however, in cases complicated with diabetes. In eczema, all acute forms are unsuited for ray treatment, but the following types are very susceptible to ray treatment: itchy eczema of the anal and genital regions, dry eczema of the hands with thickening and fissure formation, and chronic lichen simplex. The good effect is very different in such cases, though it takes about a week to manifest itself. The immediate effect is frequently an intensification of the itching, but this soon gives place to a definite improvement in which the hacks heal and the infiltration disappears, and the hyperkeratoses diminish. Schmidt claims for the ray treatment that it is pleasant for the patient, avoids the use of salves, and does not interfere with the patient's occupation. Further, it acts quickly, and is useful in chronic inveterate cases. There are no contra-indications, provided that the physician knows how to use rays properly, and avoids exposing to their action parts such as the scalp, scrotum, or ovarian region, which might suffer from the rays.—*Ztschr. f. diätet. u. physik. Therap.*, Leipzig, 1906, June.

Formic Acid.

Convers gives a somewhat guarded report of the efficacy of this drug in mental conditions. He was induced to try it by the glowing accounts of Clément, who claims that formic acid raised both the physical and mental tone. Convers gave for upwards of a month to thirty patients 45 grs. of formate of sodium daily. In many cases the exhibition of the drug was rapidly followed by a marked increase in the appetite and improvement in the digestive function. Parallel with this increase in weight there was mental improvement in many cases of melancholia and mental confusion of a more or less acute type. In his opinion, these cases would have recovered in any case, but he is inclined to think that the drug had a beneficial action on the general condition, since there was constant improvement from the commencement of the treatment. It seemed to act badly in certain cases of epileptics whose bodily condition was poor.—*Ann. méd.-psych.*, Paris, 1906, No. 3.

INSANITY.

UNDER THE CHARGE OF

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The Psychic Functions of the Prefrontal Lobe.

A contribution to the localisation of the higher psychic functions has recently been made by Professor Mills and Dr. Weisenburg (*Journ. Am. Med. Ass.*, Chicago, 1906, February 3). Their patient, a well-known physician, died at the age of 71, after a few months' illness, during which he had exhibited some symptoms of brain tumour. At the necropsy the tumour was found to be situated in the left prefrontal lobe, occupying the anterior third of the first frontal convolution, the anterior fourth of the second, and slightly less of the third. It occupied practically the entire orbital surface, and on the mesial surface the entire area cephalad and ventral of the knee of the corpus callosum. It also involved the corpus itself, the mass projecting towards the other hemisphere. On section, the growth involved the entire sub-cortex and cortex of the first and second frontal convolutions, but only the orbital portions of the cortex of the third frontal, the outskirts of the growth reaching only to within three-eighth's of an inch of the cortex laterally. The tumour extended backwards so as to involve the anterior extremities of the nucleus caudatus and internal capsule. Posterior to the tumour in the Sylvian fissure a fresh hæmorrhage was found, which in large part destroyed the insula. The nerve cells of the cortex were in a fair state of preservation. The arteries were markedly sclerotic. The optic nerves were slightly degenerated.

The mental and physical symptoms corresponding with this lesion began to be noticeable only a few months before death, though fully a year before his mental faculties were, on reflection, seen to have been less active. This, however, was originally attributed to advancing years. Two months before his death he was seen by Mills, but a careful examination could not be made at that time. He had no paralytic nor sensory symptoms then, and had made no complaint of pain. Soon after he developed a shuffling gait and muscular inco-ordination. Then muscular tremors appeared on the left side first, but later on the right also. About six weeks before death he had occasional vomiting for a week, and at intervals a week later. Two weeks before death he became unconscious. He then rallied somewhat, but coma returned, and he died without any convulsions. The mental symptoms are described in greater detail by the son, also a physician. The first noticeable symptoms were seen four months before death, though, on looking back, as above mentioned, some slight changes were observable nearly eighteen months before. He was deficient in the mental grasp he had before possessed. He then became somewhat careless in his habits. Loss of memory developed rather suddenly four and a half months before death. Memory for recent events was first affected. Judgment and comparison failed more gradually. Change in disposition was an early symptom. He was less talkative and less observant. Writing became affected about the same time as memory. He gradually became more and more confused.

In addition to the description of the case, the authors give a critical review of the opinions of various writers on this subject. A photograph of the brain assists materially in the exact localisation of the tumour.

The Pupillary Reflexes in General Paralysis.

An interesting investigation has been published by Dr. E. Marandon de Montyel (*Gaz. d. hôp.*, Paris, 1906, February 15), giving the results of several years' close observation of the pupillary symptoms of 140 general paralytics. The special value of this investigation lies in the fact that the observations were continued on the same patients from their entry into the hospital until their death. Of the 140 cases, fifty died during the first stage, thirty-six during the second, and fifty-four during the third. In this paper the pupillary reflexes to light and to accommodation are alone considered. The following are the chief conclusions at which he has arrived. At one stage or other of the disease these reflexes are always affected either alone or together. The alteration in these reflexes is never permanent. They are more often affected together than alone, and of the two the light reflex is more often disturbed.

In the first stage the two reflexes are abnormal in more than half the cases; the light reflex is more often affected by itself; and the two are affected together as often as each by itself.

In the second stage the light reflex is still the more frequently disturbed; there is greater proportional disturbance of the two reflexes than in the first stage; and their simultaneous affection is more common than their isolated.

In the third stage the two reflexes are simultaneously affected in two-thirds of the cases during the whole of this phase; for a certain period both may be normal, either together or alone, or even for the whole period; the accommodation reflex is the more often affected, contrary to what prevails in the two preceding stages; and simultaneous affection of both reflexes is three times more common than of either alone.

During the progress of the disease the affection of the reflexes is likewise progressive.

At the end of the paper an indication is given that other eye symptoms met with in general paralysis will be dealt with on a future occasion. This further contribution to an interesting and important subject will be looked forward to with appreciation.

Family Care of the Insane.

Dr. Gross, of the asylum at Schussenried, gives an account (*Med. Cor.-Bl. d. württemb. ärztl. Ver.*, Stuttgart, 1905, November 25) of his experience of what is known in Scotland as the boarding-out of patients from asylums. It is a system which in that part of Germany where his asylum is appears not to have been tried before, and the trial of it reported by Dr. Gross has been on a very small scale. But so far as it has gone it has been quite successful, and warrants further development. The author is evidently unaware of the extensive use which has been made of this system in Scotland, as he makes no reference whatever to it, while Gheel, Lierneux, and other colony settlements are duly recognised. The arguments he adduces in favour of it are quite well known to us here, and are found to be equally strong in Germany. One important difference between the practice in the two countries lies in the fact that at Schussenried the patients, though boarded out in families, are still regarded as under the care of the asylum authorities, who are required to visit them periodically and observe their physical and mental condition. This has its advantages, though it has also certain obvious disadvantages, *e.g.*, it limits the choice of a family to whose care a patient might be sent, to one within accessible distance of the asylum. Dr. Gross's experience of the relative costs of asylum and family care is much in favour of the latter. The average cost in the asylum is £30. In the family it varies from £7, 10s. to £22, 10s., but is on the average about £15. There is thus a considerable monetary saving effected by this method of dealing with suitable cases. It is to be hoped the relation of this success in Germany will strengthen opinion already in its favour and convert some who may still be sceptical.

The Effects of Exercise in Conditions of Depression.

An example of the exact experimental work which is now being vigorously prosecuted in the M'Lean Hospital, Mass., in the domain of psycho-physiology and pathology, is that of Drs. Franz and Hamilton, recently published (*Am. Journ. Insan.*, Utica, N.Y., 1905, October). It is an attempt to express in exact terms the effects of rest and exercise upon certain simple mental processes in those suffering from mental disease. Two series of experiments were made, the first with one, the second with two patients. All the patients were slightly melancholic, but sufficiently mentally sound to co-operate in the experiments and perform them in a satisfactory manner. In the first series, tests were directed to the investigation of pressure and pain sensibility, the rapidity and accuracy of movement, and the speed of reading. The tests were made every day, and on certain of these the patient pursued his normal routine, while on the others he was subjected for a short period to mechanical vibration along the spine. In the second series the tests were made upon simple and choice reaction times, on the rapidity of movement, and on the time occupied by processes involving reading and discrimination. Two series of tests were made each day, and on alternate mornings the patients were made to rest quietly during the interval, while on the other days the patients took two hours' brisk walking exercise. For the details of the experiments the paper itself must be consulted.

The following is a summary of the results.

Pain and pressure sensation are duller in melancholia than normal. As the melancholia passes off, these sensations become more normal. Accuracy of movement is not affected. Speed of movement is lessened, and improves *pari passu* with improvement in the mental state. Mechanical vibration increases the rapidity of movement, and stimulates pain and pressure sensation. The speed of mental processes is increased as the melancholia passes off.

The last is the most interesting deduction. It is to the effect that after moderate exercise there is more improvement in all these directions than after a similar resting period. Incidentally it was also noted that the depression and mental retardation were also less after exercise, though the former was of course not capable of measurement in exact terms. This is an important confirmation of the clinical experience of certain physicians, that in some cases at least of mental disease exercise is more beneficial than rest.

DISEASES OF THE EAR, NOSE, AND THROAT.

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Bier's Congestion Treatment in Affections of the Upper Air Passages.

Polyák of Budapest has made a number of observations with the congestion treatment upon various affections of the upper air passages (*Arch. f. Laryngol. u. Rhinol.*, Berlin, Bd. xviii. Heft 2). Amongst them we may note acute suppuration of the maxillary sinus, nasal catarrh, acute pharyngitis, and tonsillitis; chronic catarrh and tuberculosis of the larynx. The technique of the treatment consists in the application to the neck of the patient of an elastic bandage. It is important that this should be placed low down on the neck, this being specially attended to in cases where it is desired to produce congestion in the larynx or in the upper part of the trachea. In any case, however, it is preferable that the bandage should not lie upon the larynx, as it is apt to produce uncomfortable symptoms; while, if placed lower down, even if the thyroid gland is enlarged, it can be borne without so much discomfort.

When placed low down—a considerable degree of pressure being unnecessary—patients can take their meals quite satisfactorily. Polyák has not observed any signs of pressure upon the neck even when the bandage has been applied for a length of time.

As regards the causation of any harmful influence, no observer has as yet reported upon it. The writer has not collected any disastrous experiences, though in some patients, after two or three days, pain has been complained of in the neck, passing up to the ears, not, however, very intense. The pain must not be confounded with that caused by a tuberculous condition of the larynx, the more so as that due to the latter condition is very quickly alleviated by the congestion treatment. The duration of the treatment varies somewhat. In general, in treating conditions of the nose and pharynx, Polyák has employed it on an average from eight to twelve hours per diem, with intervals of from one to one and a half hours, two or three times daily. In laryngeal affections the pressure was made at the commencement two or three times daily for periods of thirty minutes, then for an hour, the application being controlled especially at the beginning by laryngoscopy. When well borne he has treated cases of laryngeal tubercle from eight to ten hours per day.

Another method of applying hyperæmia as a means of treatment, is by the use of a suction apparatus. This is employed in affections of the tonsils and of the posterior pharyngeal wall. The suction glasses may be applied twice daily, or at the most, three times, for a period of five minutes, which in general suffices. He has observed the inflamed tonsil become about one-third its size in five minutes. In phlegmonous inflammation of the tonsil, where an incision has not evacuated any pus, after a short application of the suction glass, the swelling of the peritonsillar tissue and the œdema of the mouth has decreased. If the head is kept forwards during the period of treatment, the saliva will flow from the mouth and not inconvenience the patient.

As regards general conlusions to be drawn from a trial of this line of treatment, it may be said that the method is simple, is easily applied, and in no case has it caused any disastrous result. At the same time care is necessary. Cases of laryngeal tubercle must be treated in hospital, except after the application of treatment for one week has been followed by evident improvement. The possibility of setting up a dangerous œdema causing marked dyspnœa must be kept in mind, consequently the necessity of careful supervision in these cases. The writer's main reason for drawing attention to this line of treatment is to induce others to give it a trial.

Thiosinamine in the Treatment of Tinnitus Aurium and Deafness.

Tinnitus is such a distressing symptom in ear disease, that any means advocated for its relief should be carefully considered. The use of thiosinamine in the treatment of subjective noises in the ear has been reported by a few observers. The results must be accepted with caution. Beck (*Laryngoscope*, St. Louis, 1902, June) reported five cases in which this drug was the only treatment administered, with indifferent success.

When used along with the Eustachian catheter, etc., the results were better, but in these cases there is another therapeutic element introduced. Somers reported twelve cases: two were cured, six so much improved that they ceased to apply for further treatment; one was relieved, while in three no improvement was obtained. Apparently in these cases, also, other means were employed in conjunction with the thiosinamine. Another observer employed it for six months before noting any result. M'Cullagh (*Med. News*, N. Y., 1905, December) has treated a number of selected cases in which the tinnitus has lasted at least six months and had resisted the usual forms of treatment. The Eustachian catheter and massage were, however, employed during the administration of the drug. The conclusions drawn by this writer are—(1) That the drug exerts a markedly beneficial action on ear disease accompanied by the formation of new connective tissue; (2) that this beneficial action is due to an increased pliability of the connective tissue, thus allowing the usual forms of treatment to accomplish their object better; (3) that its administration should always be accompanied by mechanical means; (4) that as good results may be obtained by the administration by the mouth as by subcutaneous injection; (5) that better and more prompt results may be obtained in recent cases; (6) that it exerts a beneficial action on vertigo; (7) that care should be taken in looking for contra-indications; (8) that better results may be obtained with it in the relief of tinnitus than with any other drug hitherto used. Thiosinamine may be administered through the Eustachian catheter, injected directly into the tympanum, injected subcutaneously, or given by the mouth. In the latter case, the dose is from one-half to three grains thrice daily. It has a selective and absorptive action on low-grade tissues, and especially on new connective tissue, and it is on this account that its use is suggested in this field. Vertigo has been noted as following its use, but apparently this symptom has been overcome by increasing the dose.

Sugar has administered thiosinamine through the Eustachian catheter in ten cases of middle ear deafness (*Arch. f. Ohrenh.*, Leipzig, vol. lxii.). Eight of them were cases of chronic non-suppurative catarrh in which there was no evidence of labyrinthine mischief, while in the remaining two, the tympanic membrane was adherent as the result of an old suppuration of the middle ear. In three of the cases the drug was administered through the Eustachian catheter. A 10 per cent. solution in glycerine and water was used, and five or six drops were introduced daily for a period of three weeks. At the end of that time he considered that the hearing was improved, while the subjective noises were stated to be less. In seven cases the drug was injected subcutaneously in the form of a 15 per cent. solution in alcohol. In some of the cases the injection was made three times weekly, and in others a daily injection for a period of four weeks. Hirschland, writing upon the same subject, recommends the use of fibrolysin, which is a watery solution of thiosinamine and salicylate of sodium. This he injected subcutaneously, combining the treatment, however, with the catheter. In his cases all other forms of treatment had previously proved ineffectual. As a result of the administration of thiosinamine, the hearing power improved in some, while in others the tinnitus disappeared without any change in the hearing. According to Brinitzer (*Berl. klin. Wchnschr.*, 1906 January) vomiting and lassitude may accompany the use of this drug, and sometimes a peculiar eruption of the skin has been noticed.

HEADACHE OF NASAL ORIGIN.

THAT the cause of headache may be found in the nose is common knowledge. It is equally certain that in many instances the etiology of the headache in this region has been overlooked. Some practical points in connection with the nasal origin of headaches are referred to by Lambert Lack (*Practitioner*, London, 1906, June). Patients complaining of headache may be free from any symptom suggesting a nasal affection, and hence attention may not be directed to the nose. It is very important, however, to avoid the mistake of associating the headache with the nose without a thorough general examination being made so as to exclude every other possible source of mischief. The headache resulting from nasal affections may vary much in character, in situation, and in intensity. It may be constant or periodic; it may be localised to the frontal region, to the vertex, or to the back of the head. It may occur as a true hemicrania. There may be nothing in its character to differentiate it from headache due to diseases of other organs or to general causes. It is, however, apt to be more circumscribed and more continuous than headache due to other causes.

Certain nasal conditions may give rise to headache. For instance, headache may result from nasal obstruction. We find it in children suffering from adenoids, and in adults with nasal polypi and hypertrophic rhinitis. Again, there is referred pain from nasal pressure. This is seen in the headache due to enlargement of the anterior end of the middle turbinated. This bone is probably compressed between the septum and the outer wall of the nose. The pain is referred to the supra-orbital region of the same side, whence it may radiate down the nose into the eyes and across to the opposite side. When severe, it may be accompanied by superficial tenderness in the supra-orbital region and even the nasal bone. It may simulate frontal sinus suppuration. The pain accompanying an enlarged middle turbinated is frequently periodical, depending upon intermittent swelling of the mucous membrane covering the bone. Large spurs on the septum pressing into the turbinateds may also cause headache.

Again, it is necessary to bear in mind the headache accompanying acute and chronic inflammatory affections of the nasal accessory sinuses. Attempts have been made to localise pain in certain areas as distinctive of disease in this or that sinus. This is not always possible. It is sufficient to bear in mind the possibility of sinus mischief in certain cases of headache.

A headache should never be considered neurotic or functional in origin until every source of local trouble, amongst which nasal affections occupy a prominent place, has been excluded.

PUBLIC HEALTH.

UNDER THE CHARGE OF
J. BUCHANAN YOUNG, M.B., D.Sc. (Public Health),
ASSISTANT TO THE PROFESSOR OF PUBLIC HEALTH, UNIVERSITY OF EDINBURGH.

The Milk of Tuberculous Cows.

Professor M. G. Moussu, of the National Veterinary School, Alfort (*Rev. d'hyg.*, Paris, tome xxvii. No. 12), in a valuable communication on this subject, gives the results of experiments made by him with a view to determining whether or not the milk from cows giving a positive reaction to the tuberculin test, but with apparently healthy udders, can contain the *Bacillus tuberculosis* and can produce tuberculosis in the consumer. In one series of experiments he injected the centrifuged deposit from the milk of cows apparently in good health, without any signs of tuberculosis, but which reacted positively to the tuberculin test, into guinea-pigs. These cows had, of course, no lesion of the udders, and their milk was apparently of good quality. The milk was drawn with all precautions to avoid contamination into sterilised flasks (250 c.c.). The udders were washed with soap, then with boiled water, and the teats carefully dried. The milk so collected was centrifuged, and the inoculations were made with the centrifuged deposit. The decantation of the supernatant fluid was carefully done, so as to have not more than a few cubic centimetres of product for each inoculation. Fifty-seven inoculations on guinea-pigs were made from different cows in this manner, with positive results in seven cases. Moussu admits that the proportion of positive results is small, but points out that they are sufficient, in his opinion, to show that samples of milk, which one would have thought innocuous, could be dangerous, containing virulent tubercle bacilli. Although in the majority of cases the results were negative, it does not imply that the milk used for inoculation was not dangerous, as the results might have been different had he made multiple and successive inoculations, or used still larger quantities of the milk.

Another series of experiments consisted in feeding young calves with the milk from four milch cows which had reacted at least twice to the tuberculin test, but had no appreciable clinical signs of tuberculosis, and with apparently healthy udders. The calves experimented on had, immediately after birth, been isolated in a perfectly clean place, and were submitted to the tuberculin test, with negative results, when eight days old. During the whole time of experiment the calves were not allowed to come in contact with the foster-mothers, except when put to the teats. When feeding was over, they were *at once* removed to their place of isolation. Of the five calves so fed for from two to six months, two became infected with tuberculosis through the alimentary tract. In one of these, on post-mortem, there was nothing unusual in the lungs nor in the mediastinal or bronchial glands, and the mesenteric glands were only slightly hypertrophied. However, on injection of the pulp of these glands into guinea-pigs, tuberculosis was produced. Both animals gave a positive reaction to tuberculin after three months' feeding in this way. The author considers that infection by the respiratory passages was impossible, owing to the careful isolation of the calves in a place which was frequently disinfected, and they only being in contact with the foster-mothers at feeding time. He does not attempt to explain why all did not become infected with tuberculosis, except by suggesting the possibility of individual susceptibility having something to do with it. In his conclusions he expresses the opinion that every tuberculous cow, without exception, should be excluded from milk production, since it is impossible clinically to discover commencing tuberculosis of the udder, and since veterinarians can discover latent tuberculosis by inoculation with tuberculin.

He also asks the question, if there is not ground for inquiring whether what takes place in the case of tuberculous milch cows may not also take place in the case of the human species as regards tuberculous wet nurses? In elucidation of this point, he proposes to continue his researches by the method of multiple inoculations of milk from such persons into guinea-pigs. He points out one fact in favour of the human species, namely, that the mammary function is temporary and essentially intermittent, and there is not the functional "over-driving" as in the case of milch cows.

Bacteriology of Typhoid Fever.

Friedel (*Hyg. Rundschau*, Berlin, 1906, No. 1), in an interesting paper on the methods employed in examining blood, fæces, and urine from cases of suspected typhoid fever, gives the results of the examination of such material at the Royal Government Laboratory at Coblenz, as well as some interesting facts pointing to the necessity for the disinfection of the stools and urine of convalescent typhoid patients.

From 8th September 1904 to the end of September 1905, 1765 examinations in relation to typhoid fever were made in the laboratory. Of 589 Widal tests of blood, 297 gave a positive reaction, and in 794 examinations of fæcal matter in 173 cases the *B. typhosus* was found present. As regards urine from cases of typhoid fever, only in twenty-nine of the 472 specimens examined was the bacillus found. During the period referred to 444 cases of typhoid fever were officially notified to the authorities, and in ninety of these, for one reason or another, no bacteriological examination was made to confirm the diagnosis of the physician. Of the 354 remaining cases, 264, or 74·4 per cent., gave a positive reaction with *B. typhosus*, and 66, or 18·6 per cent., were positive when tested with paratyphoid bacilli, leaving about 7 per cent. giving a negative result to both *B. typhosus* and *B. paratyphosus*.

Of special interest as regards the persistence of *B. typhosus* in the stools of convalescents, and of the possible spread of the disease by such stools if not disinfected, or improperly disinfected, is the account given of several recurrent epidemics in the Lunatic Asylum of Andernach. The last outbreak is most striking. It occurred in September 1905. There are about 500 patients in the asylum, with staff and officers, about 650 in all. There were thirty-five cases, and it was from various facts thought that the infection was by food, but the actual vehicle or source of infection was not apparent. It was resolved to examine the urine and fæces of the *personnel* of the kitchen, and it was found that the dejecta from a slightly imbecile old woman, æt. 65, who had been employed for some years in the cleaning and preparation of vegetables, contained the bacillus of typhoid fever. This woman had never been suspected of having typhoid fever, and it is possible that the cases of typhoid fever were attributable to the infection created by her. She was, of course, ignorant of any danger, taking no precautions, and as she was frequently employed in preparing vegetable salads, especially potato salad, the possibility is great. It is probable that the slices of potato infected with the *B. typhosus* by the hands of this old woman formed a favourable medium for the development of the organism, and were subsequently consumed by the inmates and staff. The bacilli could the more certainly preserve their virulence, since, as the potatoes were already cooked, they were not exposed to a high temperature. This outbreak apparently indicates the necessity for the disinfection of the dejecta of convalescents from typhoid fever for a considerable time after the establishment of convalescence.

TUBERCULOSIS IN THE TRANSVAAL.

DR. PAKES, Bacteriologist to the Transvaal Government (*Transvaal Med. Journ.*, Johannesburg, vol. i. No. 7), in discussing this question, quotes the statistics of the examinations of sputa conducted in the Government laboratories during the past three and a half years. In all 1836 specimens of sputum were examined for tubercle, with the following results:—

	Positive.	Negative.	Total.
Whites	513	904	1417
Natives	68	333	401
Coloured	5	12	17
Chinese	1	0	1
	587	1249	1836

From this table it is apparent that among the specimens examined from white patients, tubercle was found in 36·2 per cent. of the specimens. Among these specimens comparatively few were duplicates, and assuming that 10 per cent., which the author considers a large allowance, of the positive, were duplicate or triplicate specimens, there would still be a percentage of 32·6 positive results. Pakes is convinced that while several of the positive specimens were known to him as coming from patients who were Colonials who had never been out of South Africa, the majority were from imported patients. He says that "a danger known to every Transvaal practitioner, but which does not seem to be recognised by the medical profession at home, is the introduction into the colony of patients suffering from tuberculosis who have not a sufficiency of money to enable them to live without earning their living." These men are able to earn their livelihood only in a town, and the towns on the high veldt, such as Johannesburg and Pretoria, are all very dusty in winter. He considers that the dust must have anything but a beneficial effect on phthisical patients, and questions whether the advantages of the dry atmosphere and sunshine are not more than counterbalanced by the disadvantages of the dust. These people are a source of danger, especially in the absence of poorhouses. Many of the specimens examined were derived from miners, who were also suffering from silicosis.

In the case of the natives the number of specimens examined is rather small for forming a reliable opinion. The percentage of positives is very nearly 17 per cent., which would seem to indicate that the natives are very susceptible to tuberculosis. As the natives work alongside the whites in the mines, it is possible that some of their tuberculosis is acquired in the mines, but whether they acquire it in the mines, in service, or in their kraals, is a question which has yet to be determined. Dr. Pakes asks, Is the experience of the Maoris to be repeated in the South African Aborigines? In conclusion, the author points out that there is one satisfactory feature as regards tuberculosis in the high veldt, namely, that tabes mesenterica is exceptionally rare among children. This may be accounted for by the comparative absence of bovine tuberculosis in the Transvaal,—tuberculosis in cattle, according to reliable authorities, being exceedingly rare. What will be the result of the stalling of cattle in byres for the supply of milk in large towns remains to be seen.

Food Standards.

The Report of the Board of Health of the State of New Jersey for the year 1905 contains a copy of the very excellent revised circular and laws, issued by the Board, in relation to Food Stuffs. In it there is definitely laid down for a great number of food stuffs, beverages, condiments, etc., the definition of such substances and the standard required by law. This is a subject on which, in this country, the Legislature might, with very distinct advantage to the public, follow the example of the State of New Jersey. For example, *milk* (*whole milk*) is defined as "the lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and five days after calving, and contains not less than 8·5 per cent. of solids not fat and not less than 3·25 per cent. of milk fat." *Skim milk* is "milk from which a part or all of the cream has been removed, and contains not less than 9·25 per cent. of milk solids." These are only taken as examples of the definite way in which the standards are fixed. The adoption of similar standards is urgently required in this country, especially as regards milk, butter, etc.

REPORTS OF THE MEDICAL SOCIETIES.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.—*July* 4, 1906.—Dr AFFLECK, President, in the chair.—Specimens were shown by Mr. F. M. CAIRD and by Dr. ALEXANDER BRUCE.—Dr. H. M. CHURCH demonstrated Gärtner's tonometer for estimating blood pressure. — Dr. KEPPIE PATERSON read notes of a case of ruptured gastric ulcer in a boy, æt. 12. The patient had suffered from indefinite dyspeptic symptoms for twelve days. After perforation occurred there was the usual severe epigastric pain, but in addition very severe pain in the region of the left clavicle and shoulder was complained of. This was even more severe than the epigrastic pain. Liver dulness was present at the beginning, but disappeared later. Operation was performed eighteen hours after rupture, and the opening closed. Pneumonia supervened on the eighth day, both lungs being involved. For this complication oxygen inhalation was employed, and found of great value. The patient recovered after a long convalescence. Dr. Paterson then gave an abstract of reported cases of gastric ulcer in children. Ulcer occurs in children of all ages, and may be simple or multiple. Only one case was recognised during life and successfully operated on, in addition to the one now reported on. All the others were only recognised post-mortem. From the records it would appear that gastric ulcer occurs more frequently in children than is supposed.—Mr. F. M. CAIRD read a paper on "Twenty-five Consecutive Cases of Operation for Perforated Gastric Ulcer." The usual symptoms are pain, vomiting, epigastric and suprapubic tenderness, and rigidity of the abdomen. Liver dulness may or may not be present. Rectal examination frequently reveals tenderness in the pouch of Douglas. Hæmatemesis and melæna are not common. Of his twenty-five cases, fifteen were in female and ten in male patients. In four cases pain referred to the left shoulder was present. One may operate, using a general anæsthetic, cocain locally, or stovaine injected into the spinal canal. The ulcer should be closed with interrupted sutures of fine silk. Excision of the ulcer is not to be recommended. With reference to the site of the ulcers, eighteen were in the anterior wall, four in the posterior wall, and three in the duodenum. It is important always to employ suprapubic drainage. The prognosis after operation is based on several points, but the most important by far is the condition of the pulse. Intravenous transfusion of saline water is of great value when the pulse tends to become too rapid. Vomiting is best treated by gastric lavage. The mortality in the cases he had operated upon was 36 per cent.—Mr. ALEXANDER MILES read a paper on "Observations on Perforated Gastric and Duodenal Ulcer, based on a Personal Experience of Forty-six Cases operated upon," which will appear in the Journal.

EDINBURGH OBSTETRICAL SOCIETY.—*July* 11, 1906.—The July Meeting was a Conjoint Meeting with the Glasgow Obstetrical and Gynæcological Society, and was held in the Caledonian Station Hotel, Edinburgh, at 5 p.m.,—Dr. J. W. BALLANTYNE in the chair.—Emeritus Professor Sir ALEXANDER RUSSELL SIMPSON, Edinburgh, Professor MICHAEIFF, Moscow, and Professor BOSSI, Genoa, were elected Honorary Fellows.

—Professor Stephenson of Aberdeen introduced a discussion on "Irregular Manifestations of Puerperal Sepsis." The discussion was taken part in by a large number of Fellows, who related their experience of unusual forms of puerperal sepsis. Puerperal mania and puerperal rashes were especially referred to, but several other irregular manifestations of sepsis were narrated. The Fellows of the two Societies afterwards dined together in the hotel, Dr. J. W. Ballantyne in the chair. After the loyal toasts, the Chairman proposed "The New Honorary Fellows," coupling the toast with the name of Sir Alexander Russell Simpson, who in a most interesting speech replied. He sketched the history of the Edinburgh Obstetrical Society and his connection with it. Dr. Haultain proposed the toast of the Glasgow Obstetrical and Gynæcological Society, and Dr. Oliphant, the President, replied. Professor Murdoch Cameron proposed the toast of "The Chairman."

ANALYTICAL REPORTS.

Xeroform (Chemische Fabrik von Heyden, Radebeul).

(E. W. Blasius, 127 Fenchurch Street, London, E.C.)

Xeroform is one of the numerous bismuth compounds which have recently been introduced with the object of producing a substance combining the astringent properties of bismuth with the antiseptic action of the benzol series. Chemically, it is bismuth tribromphenolate, and occurs as an insoluble, unirritating yellow powder, with a faint odour of iodoform. Its chief applications are those of the latter drug, for which its comparative lack of odour makes it an agreeable substitute. It is practically non-toxic, being decomposed in the intestine into bismuth, with the liberation of an aromatic antiseptic group which presumably acts as a disinfectant in intestinal disorders. There is thus a rational explanation of the success which has attended its employment in various forms of diarrhœa and intestinal auto-intoxication.

Liq. Violæ Glucosidi (Gadd).

(Evans, Gadd, & Co., Exeter.)

The advocacy of violet leaves in the treatment of cancer has doubtless been the stimulus which has directed Mr. Whippell Gadd's investigations of the chemistry and pharmacy of *Viola odorata*. He proves that a glucoside (viola-quercitrin) is present to the extent of 5 per cent. by weight in the fresh leaves, but has been able to isolate no volatile constituent, nor to find an alkaloid nor salicylic acid. The liq. violæ glucosidi is a standardised commercial preparation containing 5 per cent. of the glucoside, which is an unstable body, and has eluded isolation. An account of the chemistry and pharmacy of violet leaves will be found in a paper read before the Therapeutical Society on 19th December 1905, and, while the pharmacology of the body in question has not as yet been investigated, Messrs. Evans, Gadd, & Co. deserve credit for rendering feasible a scientific inquiry into the alleged properties of violet leaves by producing commercially a definite preparation of known and constant strength.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

Dechlorination and Salt-Eating.

In the introduction of dechlorination, or deprivation from salt, as an efficacious means of treating nephritis and other dropsical conditions, we have another added to the many instances of an apparently profitless scientific investigation leading to very tangible results. When, some years ago, papers began to emerge from German laboratories on the precise freezing-point of the blood in different diseases, it must have seemed to many that such epicene studies could scarcely be fraught with practical benefit,—yet so it has happened. Although cryoscopy remains a diagnostic aid of only inferior rank, the impetus which it gave to the study of the molecular concentration of the tissue fluids and of the salt interchange of the body, has led to a revision of our conceptions in several directions.

For one thing, the current supposition that salt, beyond what is natural to the food, is necessary for health, has been proved erroneous. The prevalence of the notion is due to the esteem in which salt has been held by man through immemorial ages, as is testified to by the imprint which its use has left on our civilisation. The oldest trade routes in the world were those along which salt was carried; to this day, among the high-roads of Italy there exists the ancient Via Salaria, which led from the salt pans of Ostia into the heart of the Sabine country; and in the time of Herodotus, as now, the caravan tracks of the Libyan desert, from salt oasis to salt oasis, were mainly for trade in salt. Salt taxes and government monopolies have the sanction of ancient usage; alike part of the fiscal policy of the Roman dominion and our Indian Empire, they are economically justifiable on the ground that salt is a luxury, not a necessity, although their oppressive enforcement by extortionate rulers is a commonplace of Oriental history, and in the West contributed to the fall of the French monarchy. Our own word "salary" derives from the fact that the Roman soldier received part of his wage in salt; the same product enters into the pay of the French Soudanese battalions, and salt-cakes have served as currency in regions so remote from each other as China and Central Africa. The religious significance attaching to salt is testified to by a widespread belief that saline springs are sacred. The Germans waged war for them, as Christendom did later for the Holy places of the East; salt entered into sacrifice and covenant, and both Oriental practice and Western proverb make disloyalty to salt a heinous crime. These sociological aspects of salt-eating are not wholly devoid of biological meaning. When we come to inquire why the commodity reached so high a place in man's estimation, we find that "the habitual use of salt is intimately connected with the advance from nomadic to agricultural life . . . with that step in civilisation which had most influence on the cults of almost all ancient nations" (Robertson Smith). In other words, men who subsisted on milk and raw or roasted flesh had (like some Bedouins to-day) no craving for salt, while, when a cereal diet with boiled meat is adopted, salt is added, doubtless to confer the accustomed sapidity to the food. Alleged instances of privation from salt (as during the siege of Metz) having produced disease, do not bear careful scrutiny, for in all of them other contributory causes occur. In fact, there is no doubt that salt-eating is a taste acquired by man, just as he has learned to enjoy alcohol and tobacco; the universality of the practice represents as much, and no more, a need of the organism as these do. For proof of this some of Widal's observations on dechlorination may be cited.

Normally, the amount of salt required to replace what is lost by the tissues is much below that naturally present in the components of an ordinary diet, and the salt which is added as a condiment is eliminated in the urine as fast as it is ingested; in health there is, under ordinary circumstances, a state of chloride equilibrium. The cells of the body are bathed in saline fluid, and it has long been recognised that normal isotonic salt solution is innocuous to cell life. If a healthy man be deprived of salt, he for a day or two eliminates more than is ingested, and thereafter equilibrium is restored. During this period the weight falls. If, thereupon, salt be added to the diet, less is excreted than has been consumed, until again, in a day or two, equilibrium is restored, and the weight regained. The explanation is that the needs of the organism imperatively demand that the saline fluid which permeates the tissues should remain of unaltered concentration, and this is effected by the retention in the body of just enough water to keep the salt in isotonic solution. Many details of the osmoregulatory mechanism remain obscure, but a salient fact stands out in the adequacy of healthy kidneys to excrete large quantities of salt. This power, however, has limits, as shown in instances of its having been overtaxed by an inordinate consumption of salt, which was therefore retained in the body, attracted to itself water, and produced dropsy. In Bright's disease, attended by œdema, the permeability of the kidneys to salt molecules is largely abrogated, hence salt retention, with dropsy, ensues. The value of a milk diet, long known empirically, is now believed to depend largely on its comparative poverty in salt, three and a half pints containing about a drachm instead of the 200 or 250 grs. which custom adds to ordinary food. But, by excluding salt from the bakehouse and kitchen, an average mixed diet, including 6 or 7 oz. of meat along with cereals, will contain only some 15 or 20 grs. of natural salt, and hence may be better tolerated by a nephritic patient than the "bland, unirritating" milk.

It matters not why the salt is retained in the body—dropsy will result. In heart disease the retention is caused by stasis of the blood; we combat this by cardiac tonics, while by limiting the intake of salt we lessen the tendency to hydration of the tissues. Many of the problems connected with salt retention—its relation to uræmia for example—are by no means worked out: but enough has been said to show that in dechlorination we have a promising line of research and treatment which is deserving of more attention than it has received, in this country, up to the present time.

Sanatoria for Working Men.

"The Consumptive Working Man: What can Sanatoria do for him?" is the title of a book (London: The Scientific Press Ltd.) recently published by Dr. Bardswell, Medical Superintendent of King Edward's Sanatorium, in which the subject is ably discussed from every point of view, special attention being devoted to the economic aspect of the question. The details of the expenditure in conducting a small sanatorium will be valuable to others contemplating starting such an institution.

When this mode of treatment was first instituted, some of the results were so highly satisfactory that it was hoped, and rashly claimed by some, that we had at length found a means not only of arresting the disease in its early stage, but of effecting a cure in more advanced cases.

Later results have not justified these views, and consequently the sanatorium treatment has temporarily fallen more or less into disrepute. Eventually we will probably find the happy mean between those who are so confident of the success in store for the treatment that they suggest sanatoria should be built and maintained at the public expense, and those who are of opinion that the results are disappointing and the mode of treatment needlessly expensive.

It is only by carefully following the after history of cases that an opinion can be formed. This with great trouble Dr. Bardswell has done in the cases of twenty-five working men who had undergone sanatorium treatment during the last six years, especially with reference to the capacity of the men, after treatment, to earn a living wage. Of ten cases in which the treatment was adopted with the disease in a very early stage, eight were restored to their normal working capacity; two sufficiently recovered to be capable of performing light work. Of fifteen cases in which the disease was more advanced, ten were absolute failures, while five were able to do a little work for a short period. The author fairly sums up the situation in the sentence: "The sooner it is generally appreciated that sanatoria, though offering the best chance to consumptives, cannot with certainty cure many, the better it will be for all concerned."

The suggestion made in the introduction, that sanatoria for the working classes should be built and maintained at the public expense, may commend itself to some, but the majority of the ratepayers will probably be of opinion that the matter is one which should be left to the benefit societies and trades unions, and we are glad to see that in the south of England these bodies have made a most important step in this direction.

One of the drawbacks of the sanatorium treatment is that it tends to make men self-centred and lazy, and, as has recently been pointed out by writers both at home and abroad, they are apt after discharge to carry these acquired habits with them. There is no reason why cases in sanatoria fit for light work should not be furnished with employment which, while diverting their minds from a morbid contemplation of their condition, would enable them to earn something towards the cost of maintenance.

A German writer has recently pointed out that patients in sanatoria are habitually overfed, and that one of the first things they should do on discharge is to reduce the amount of food to fairly normal limits; and in this connection it is interesting to note that Bardswell admits that patients tend to become "selfish and absolutely lazy." In one case fully reported (Case 3), a list is given of the very liberal dietary provided for the man in his home, while his wife and children practically starved. "This diet is taken by the patient himself, the other members of his family are not always able to afford such good food stuffs."

It is gradually being recognised that even a short stay in a properly conducted sanatorium has a powerful educational effect. The patient is taught the value of fresh air and sunshine, the good result of personal cleanliness and general hygiene, and, carrying these lessons to his home, he should be better able to regulate his own life, maintain his health, and teach others how to prevent the spread of the disease.

Amateur Science.

THE layman, in the guise of the scientific Philistine, is running riot again, and, as usual, the stampede of irresponsible cattle is on to well preserved, delicately nurtured ground. But that fact tends all the more to his egotistic self-satisfaction; the more sacred the sanctuary, the more notoriety for the poacher. The modern iconoclast is nothing if not ambitious. He is not content with small prizes. His imagination is not in the least parochial, if his methods are. With astonishing bravado he will move a resolution in the House of Commons, asserting that the world is upside down, or that black is white, and he gets his reward. Next day a Royal Commission is appointed to inquire into the matter, and he is made Chairman. Next year *Who's Who* tells us that Mr. Snooks, M.P., was "Chairman of the Royal Commission to put the world right," or "Chairman of a Select Committee of the House of Commons to inquire into the claims of White to the pretensions of Black." Lately he has caught a big fish. The whole question of Vaccination, settled years ago by scientific investigation and social experience, is to be put at the mercy of a lay Committee, and Heaven knows where the regulations may have landed us next year. There is no person whom the pretentious and ignorant M.P. is more suspicious of than the man of science. He never will believe that the basis of scientific research is altruistic. He views him as every ignorant Englishman who has not been in Ireland views the Irish landlord. His very name condemns him. In his view the man of science goes about like a viper seeking whom he may destroy. This remark applies more forcibly when he approaches the subject of Vaccination, which also is evidently to be made the subject of hasty and ill-considered legislation. The man who practices vivisection does so, from this precious layman's point of view, purely from an ingrained love of cruelty. As he wields his scalpel he is simply giving himself over to a series of sensuous delights; and if you tear off the mask of the Professor, you see the diabolical face of the scientific Mephistopheles. He reverses the picture of the Silenus mask. This is to paint no exaggerated picture. The squint mind of the bigoted humanitarian never sees truth as it is; his knock-kneed sense of justice maintains that because a man searches after scientific truth, he is *ipso facto* cruel, selfish, and blind to pity of any kind. And Mr. Snooks is not to be put on one side by statistics, by the evidence of experts. To the lay anti-vaccinationist and anti-vivisectionist all calmly considered scientific evidence is an organised conspiracy, under the cloak of which a very diabolism is at work; and yet, after all, if there is any diabolism at work, it is on the part of the ignorant critic, for the spirit of it is rampant in lay circles. For diabolism simply means this, "I hate him and all his works; whether you prove them guiltless or not, it matters not to me." And so the feast goes on, the lay press winds flowers in its hair, and goes from bad to worse. With such forces you cannot argue, for your evidence is not trusted, your frankest word is doubted. The only thing that remains to fight these reactionary forces seems to be ridicule.

It is with feelings of great satisfaction we record the appointment of Dr. Noël Paton to the Chair of Physiology in the University of Glasgow.

His departure from Edinburgh is a great loss to the Extra-Academical School, in which he was not only one of the most successful teachers, but also one of its soundest advisers in all questions of policy and administration.

His inspiring personality and scientific ardour will also be much missed at the Laboratory of the Royal College of Physicians, and many will regret the severance of a connection with this important institution which has existed for nearly twenty years, and which has grown under his guidance to be of the utmost value to the profession.

What is Edinburgh's loss, however, is Glasgow's gain, and we can heartily congratulate our sister University upon obtaining a Professor who will add greatly to the scientific reputation of the University, as well as to its life and work.

At the recent competitive examination for commissions in the Indian Medical Service, forty-seven candidates presented themselves for twenty vacancies.

It is interesting to note, with reference to the frequent reference of a contemporary to the results of the Service examinations, that out of the twenty successful candidates six were students of Edinburgh University, and one was a triple qualification diplomate who studied in Edinburgh. Glasgow had two successes, and Aberdeen one. London students obtained six places, and Cambridge, Dublin, Manchester, and New Zealand each had one.

We warmly approve of the intention to make some public recognition of the long and valued services of Sir Alexander Russell Simpson. An influential committee has been formed, and it has been thought that the object in view would be most appropriately attained if funds were subscribed for the endowment of a bed in the Royal Maternity Hospital, Edinburgh, an institution in which Sir Alexander has taken the deepest interest, and which was founded as a memorial of his uncle, the late Sir James Simpson. The amount required for this purpose will be nearly £1000, but any sums contributed beyond what is necessary for the endowment of the bed will be used in making a personal gift to Sir Alexander and Lady Simpson. It is hoped that the presentation will be made early in October, as Sir Alexander proposes about that time to visit Mission stations in India and China, and afterwards to attend an important Christian Conference in Japan.

Contributions to the fund may be sent to Mr. Nicholson, manager of the Clydesdale Bank, George Street, Edinburgh.

ORIGINAL COMMUNICATIONS.

AN INTRODUCTION TO THE CLINICAL STUDY OF VASCULAR DISEASE.[1]

By Wm. Ewart, M.D. (Cantab.), F.R.C.P., *Senior Physician to St. George's Hospital and to the Belgrave Hospital for Children.*

The following are but fragmentary remarks and headings in a subject too wide for complete elaboration. As in the case of the nervous system, the other great administrative department of life, the discovery of the circulation came late, and we are still learning to realise its intricacies.

More belated still the study of its pathology, which has not yet been raised into a speciality, if that term may be used to signify thoroughness in the organisation of research. Such at least is the impression conveyed by our current nomenclature, which suggests an evolution by gradual accretion rather than by any systematic method of investigation.

The Nomenclature in its Clinical and Pathological Aspects.—Our clinical backwardness is not wholly due to the intrinsic difficulties of the subject, but largely to the defects of its terminology and to a confusing *lack of uniformity*. How much there is in a name as a help or a hindrance is perhaps best known to the student and to his teacher. But a more serious evil would be a warping effect upon the growth of thought and of investigation. Clinicians seem to be suffering less from the multiplicity of terms than from their relative paucity. We have borrowed from morbid anatomy not only its teaching, but its language: "atheroma" and "arterio-sclerosis" are both anatomical expressions. But anatomy begins where clinical medicine ends; its own special nomenclature is sufficient for its work, and the work is of less boundless scope, with easier methods and with less hurry; while clinical steps are urged on at the call of disease and of death.

The emancipation of clinical study may be a hard word; but the word fits the situation almost as well as when Lænnec originated the study of disease *in vivo*. All honour to the master-word of the pathological anatomist. We want not fewer of his post-mortem facts, but more of them. But his account of the life history of disease and of its early lesions is always an artificial reconstruction. In pathology the living clinical facts and observations have hitherto been as nothing: they should be almost everything. *Adeste* not *procul este* should be the warning to the too diffident clinical flock, hitherto expectant and inarticulate partly for want of a suitable vocabulary. A more active co-operation and greater facilities in nomenclature might be a first step in overcoming this clinical shyness. This is our first plea.

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[1] From Notes of a Clinique, delivered on 19th June 1906 at the Medical Graduates College and Polyclinic.

"Atheroma" and "arterio-sclerosis."—A conventional meaning is all that can be claimed for both these, our only clinical terms. The clinical stages in progressive verbal misapplication even to the point of *lucus a non lucendo* are familiar. Some staring abnormality, which probably as in the case of atheroma is a terminal one, is at last noticed and named. The condition may not be in itself important; nevertheless the name has to be upheld for the sake of continuity in medical literature. For instance, "anæmia" is still being applied to the chlorotic patient, although we admit that there is too much, not too little, blood in her; and "atheroma" is still occasionally used for indurative changes, although, unlike "caseation," the term is not strictly applicable to the three stages in the process, but only to the stage of softening. For a time "atheroma" stood as the only name for chronic arterial disease. As further complexity was recognised in the lesions, the term became inclusive and less accurate, and finally confusing. The sequel is well known. "Arterio-sclerosis" was introduced by Lobstein, but eventually proved equally inaccurate, for it was made to cover the meaning special to atheroma. It is true that, notably in England, the obsolete expression has not been entirely discarded; but this renders confusion worse confounded. Continuity in nomenclature might be best served by reverting to the plain and unmistakable signification of the words, particularly as "atheroma" is indispensable to define such lesions as the atheromatous ulcer, atheromatous embolism and thrombosis, and the like; whilst "arterio-sclerosis" is a correct description of the diffuse form of indurative arteritis, though now too loosely applied to a variety of arterial disorders.

Accuracy in analysis and classification is our second plea, of still greater import for progress. The endeavour to include under one name the sum of that which is known and all the unknown defeats its own ends. Much time is wasted in futile discussion, and there is a danger of increasing our burdens with doubts and errors plausibly derived from an irrelevant basis, and with the tyranny of the catchword and its well-known evils,—horizons artificially circumscribed and observation hypnotised.

THE PRINCIPLES OF CLINICAL NOSOLOGY.—*Modus oriendi, modus moriendi.*—The first of all clinical principles is *recognition for the exception.* Our nosological system may be well and truly laid, but outside its rulings the event in each particular instance is determined by the unknown value of the personal equation. Individual predisposition is the *ultima ratio,* and it is nowhere more manifest than in the vascular system. Individualism shapes our ends, sometimes even in spite of circumstances; although most often the *modus moriendi* is but a development of the *modus vivendi.*

Individualism in structure is as diverse in human arteries as it is in noses: some arteries straight, others tortuous; some strong in the fibre, yet delicate in the membrane; some taut and pumping, others slack with stagnant venous effluents, and yet capable of effort or even of endurance. Between them who shall pretend to judge?—yet this were child's play compared with an attempt to assess the sum of the *vis insita vitæ* allotted at birth by individual fate, and its dwindling value day by day as toll is levied by individual circumstances and mode of life. *Individualism in vitality* is the supreme clinical question: vitality great or small? falling an easy prey to a swarm of microbes or refractory to a legion? It is also an exclusively clinical one, unrepresented in morbid anatomy; and it constitutes a never-to-be-forgotten reservation which qualifies all our systematic classifications meant to fit the great common of mortals of healthy birth and shape.

FUNCTIONAL DISEASE AND STRUCTURAL DISEASE.—The simplest and truest basis for our clinical nosology would seem to be the anatomical and physiological basis, as each normal structure and each normal attribute in the vascular system affords an opening for some abnormality. Pathology is but modified physiology; and we deplore that the advanced clinical student should be deprived of a progressive study of physiology at the stage when it is indispensable and when it would be a precious *viaticum* for the long exploration of medical practice. Thus a serviceable classification might be founded upon a study of each structure and function; and its first degree would be a preliminary grouping into the functional and the structural disorders.

The functional group, of which an incomplete list is appended (see p. 202), has already been partly elaborated, and even in some directions almost too sharply told off from the rest, as in the case of the "angioneuroses." But, on the other hand, we discover that a good deal of functional disease is now described and debated under the heading of arterio-sclerosis. In both instances we have been right and somewhat wrong too. Disordered vascular action breeds vascular change; and structural lesions inevitably lead to perversion in function. Therefore, though it cannot be strictly correct to deal with one set independently of the other, in practice it is wise to do so for the sake of clearness in discussion.

THE ANATOMICAL BASIS OF VASCULAR NOSOLOGY, AND THE STRUCTURAL TYPES.—On the same almost automatic principle a distinction might be drawn between the affections connected with the mechanical or central cardio-vascular organs and the affections connected with the nutritional or metabolic circulation at the periphery. We shall have to consider disease as it originates either from the heart-end of the circulation, or from the capillary-end among the tissues. Any further subdivisions under this simple and natural plan of nosology are given by a study of the subordinate mechanisms and of their play.

Anatomy is at present the least defective section of angiology. It is enough, then, to enumerate the familiar three coats:

1. The adventitia: a nutrient, protecting, repairing, and supporting coat;

2. The media: a dynamic coat solely for mechanical work;

3. The intima: a "vessel membrane" properly so called, or with equal truth a "blood membrane," the essential type in the anatomy, as well as the essential worker in the practical business of the circulation.

A List of some of the Functional Vascular Conditions (see p. 201).

Changes in calibre		Passive or Hydrostatic Active (mural)	direct. reflex.
Changes in tone	Hypertonus Hypotonus	Physiological. Pathological.	
Changes in vasomotor action (arterial and arteriolar)		Vaso-spasm. Vaso-paralysis.	
Angioneuroses (arterial and arteriolar)		Angina vasomotoria. Migraine. Asthma. Cold extremities. Dead fingers. Dysbasia angiospastica. Raynaud's disease. Flushing. Blushing. Blanching, etc.	
Vascular crises (Pal)		Their several varieties.	
Histo-vascular (capillary) changes in calibre	Passive Active	Hyperæmia. Cyanosis. Ischæmia. Anæmia.	
Histo-vascular changes in exchanges	Passive Active	Excessive transudation. Œdema. Angioneurotic œdema, etc. Defective transudation.	
Blood pressure changes	Passive Active	General Local	Hypertension. Hypotension.

(*a*) The three coats vary considerably in their representation at the different levels of the vascular system, until at the periphery they all vanish with the exception of a film of intima.

(*b*) Moreover, they present serial changes in the proportion of their constituent elements, endothelial, elastic, muscular, fibrovascular, and fibro-lymphatic. This gives rise to such structural contrasts as those between the aorta, the arteriole, and the capillary,—structures so dissimilar that to discuss their lesions under one heading would be to court confusion. Obviously, there is much to be said in favour of beginning the study with the simplest rather than with the most complicated of the structural types; particularly as to study the capillary lesions and the capillary functional changes is to study the pathology of a vital membrane, and of that membrane which alone is continued from one end to the other of the vascular system.

THE PHYSIOLOGICAL BASIS IN ARTERIAL NOSOLGY. THE FUNCTIONAL SEGMENTS OF THE CARDIO-VASCULAR SYSTEM.—The futility of discussing in one breath, for instance, the aorta and the arteriole, is further apparent when we realise that their respective functions are quite distinct. Any one cause cannot operate upon both with the same results, and any one change finally overtaking both could not have had the same functional history. The aorta and the arteriole are, however, only two out of a series of *functional segments or subordinate organs* of the cardio-vascular machine, which we need here simply enumerate:

1. An "intermittent pumping" organ, the heart (in structure mainly neuro-muscular);

2. A "constant supply and constant pressure" producer, or rather converter, the aorta (mainly elastic), assisted in part by the long arteries;

3. A "conducting system," that of the long arteries (muscular as well as elastic), which share variously in the work of (2) and of (4);

4. A "distributing and checking organ" for blood stream and for blood pressure, the arteriole (pre-eminently neuro-muscular though also elastic), which might almost be called a peripheral heart;

5. The "circulation organ" par excellence, the capillary—a structural unit *sui generis,* and at the same time a functional unit, integrating in some measure the work of all three membranes, in addition to its own specialities of blood irrigation, of blood exchanges, and of tissue drainage;

6. The "irrigation and drainage system" represented by the trans-vascular intercellular nutrient currents of tissue lymph, from which arises the lymphatic system as an additional draw off collateral to the venous section of the circulation.

These, then, are the structural and functional foundations for vascular health, and therefore for disease. It is impossible in a few words to enter into their detail; but in general terms we may insist upon the essential distinction between the two main factors of health and disease: the dynamic function and the nutrient or blood function.

THE NUTRIENT OR BLOOD FUNCTION.—It is almost superfluous to state that pure unencumbered blood is the health of all tissues, and therefore also of those of the arterial wall. Poisons such as lead, ergot, adrenalin, and tobacco, purins and toxins, would first attack the intima, the vascular membrane par excellence, which is also, as stated, the "blood membrane." But an even earlier result may be the functional disturbances brought about under the influence of various irritations of the vasomotor nervous mechanisms.

THE DYNAMIC FUNCTION.—I. *The elastic function and the aorta.* —Elasticity is not a source of energy; but in the circulatory mechanisms it saves power and effort. The buffer-like action of our elastic aorta aids both heart and artery, by yielding to the systole and by toning down abruptness in the arterial wave. Rigidity of the aorta inevitably leads to cardiac and arterial strain and to dilatation of both structures. This alone would justify us in regarding elasticity as the fundamental principle upon which the circulation is engineered. As a fact, some degree of elasticity is to be found in every section of the arterial and of the capillary system. An efficient fibre is essential to the continued health and fitness of the artery, and an exceptionally perfect fibre is probably the first condition for longevity.

Besides this circulatory function, there is another duty entrusted to the elastic fibre, that of *promoting its own nutrition and that of the entire arterium*, by furthering the intramural circulation of plasma. As in the heart itself, the rhythmic pumping action of systole and diastole may be regarded as a condition of existence; and this would be favoured by oscillations of ample extent and of good quality. Its impairment would be a source of relative lympathic stagnation and a fertile but hitherto little noticed cause of obstruction and disease.

It may be also here mentioned that, just as cardiac rest and nutrition are proportional to the duration of the cardiac diastole, the arterial wall, much less richly supplied with capillaries, needs all the rest and all the nutrition which perfect oscillations can afford. The inelastic artery will be less thoroughly rested, refreshed, and nourished. It is thus apparent that the elastic fibre, when circumstances are not unfair, works out its own salvation together with that of the other vascular tissues. But, as befits so precious, so perishable, and so irreplaceable an agent, special provisions exist for its protection; and in these the muscularis takes a leading share. Fluctuations in the elastic efficiency of the elastic fibre, analogous to those in the tone of muscle, are quite conceivable, though as yet undescribed. But the production of hypertrophy from the stimulus of exercise, and a slow regeneration after disease or injury, have already been made the subject of demonstration.

II. *The muscular functions.*—Much remains to be learnt beyond the known fact that muscle possesses, in addition to its contractility, an innate and variable elasticity, before we can work out the detail of our pathological problems. We do not even know whether the arterial fibre has two modes of contraction or only one; whether the variations in tone which set the artery to the needed calibre are its only form of activity, or whether it can also actively pulsate in virtue of a more rapid and reflex contraction in response to the stimulus of the pulse wave.

III. *The musculo-elastic functions.*—I have elsewhere[1] referred to those extreme degrees of "tonus" which might compress the elastic coat beyond the neutral point, and thus furnish the elastic fibre with an active expansile power or "spring." In its usual form the musculo-elastic function is, I believe, mainly protective; the tonus of the muscle and its elasticity serving as it were to nurse the elastic fibre, to save it from too severe a stretch, and to aid its speedy and complete recoil. The mode of co-operation between the two fibres probably varies with the diameter of the artery. Whereas the muscular fibre creates artificial calibres, the main office of the elastic fibre is to restore to the artery its own normal calibre, in fact its "cadaveric position."

Tonus, hypertonus, hypotonus.—Pathologists have formulated definite ideas and statements under these headings. But in a clinical direction our advance has been much slower, with some brilliant exceptions (Huchard, Pal, William Russell, and others). Tone is a purely functional agency, but it is fraught with structural consequences. It would best serve our clinical purpose to distinguish between its variations due to physiological and those due to pathological causations.

Arterial hypermyotrophy.—This term, introduced by Savill, is serviceable if used as in these notes in its strict signification, that of hypertrophy of the muscular element itself, which of course, when it occurs, is only part of the hypertrophy of the entire arterium.

The questions of arterial tone are intimately mixed up with those of blood pressure; and questions of blood pressure with those of cardio-renal and arterial disease. It is manifest that a good deal of plain fact will be needed to clear the prevailing uncertainties, and that any attempt to further discuss them here would be impracticable.

HEALTH IN THE BLOOD VESSEL.—*The intramural circulation and lymphatic circulation.*—"Sanitas sanitatum" for the entire economy resolves itself into a good circulation and a good nutrition. These are precisely the conditions which are essential to a sound working of the blood vessels: healthy vasa vasorum and nervi vasorum to distribute, and healthy tissue lymph to convey the mural nourishment. But beyond this bald statement our knowledge of the intimate intramural circulation is rudimentary, and inadequate for the solution of our pathological problems. We know that each coat has a type of circulation special to itself, the intima almost entirely extravascular, the media rather scantily supplied with capillaries (Hoffmann), the adventitia abundantly provided with capillaries as well as with arteries and veins. But we know almost nothing concerning the *intramural lymphatics and the intramural lymph.* They have hitherto been passed *sub silentio*; and yet I venture to think that their function is of supreme importance in health and in disease, and that the freshness of intercellular supplies and the efficiency of intercellular drainage are the soul of perfect arterial health.

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[1] "Heart Studies, chiefly Clinical." 1. "The Pulse Sensations," a Study in Practical Sphygmology, London, 1904.

Of the general scheme of the intramural circulation it must suffice to state that the artery shares with the heart the following remarkable characteristics: *rhythmic life, labour, rest, and nutrition,*—steady never-ending hard work with constant risk of overwork, and an equally precarious balance in the automatic periodicity of its food and of its rest.

The solidarity between arterial labour, rest, and nutrition is close; each dependent upon the smooth working of the others, each thus evenly sharing in the preservation of arterial health, whilst each is exposed to its own special dangers, which endanger the integrity of the rest. But the full pathological significance of this principle can hardly be realised without a brief survey of the structural and of the functional peculiarities of each of the segments of the vascular system.

ARTERIAL WORK AND OVERWORK.—*The effect of work upon the arterium; the "physiological" hypermyotrophy of labour.*—Some amount of work is indispensable: *Labor vitæ vita est.* But whether physical labour is going to train, strengthen, and hypertrophy, or else to overtrain, wear out, and finally help to destroy our arteries, is largely a question of degree and of kind. The cardio-vascular consequences of muscular labour as compared with mental or light occupations, are great and conspicuous (particularly in the young), because proportionate to the extent of the vast intramuscular circulation. The heart puts on muscle, and the arterial wall, thanks to the increased bulk and quality as well as frequency and strength of its intramural circulation through capillary and plasmatic spaces, keeps pace with the cardiac hypertrophy. In this all three coats participate. The artery grows stronger as a whole, and particularly strong in its nutrient and supporting framework prolonged from the adventitia; and it is probably none the worse for being firmer, and thicker, and even palpable.

Palpability.—Juvenile athletics, or juvenile bodily labour, will render the radial artery palpable even in the young. I have found a palpable radial in girls of 17 or 18 after a year or two spent in "general" or housemaid's service; whilst the radial was not palpable in adult women of light sedentary occupation, and hardly palpable in two ladies of 87 and of 88 respectively who had never undergone systematic exertion.

Thus from the artery you might almost tell as to physical work or its absence. But observations are wanting as to the subsequent behaviour of the hypertrophied artery. Probably, "once palpable, always palpable." For, presumably, any thickening of tissue and any vascular increase within the *adventitia* would be as permanent as any increase in the dimensions of the skeleton: but this should not be mistaken for an indication of incipient arterio-sclerosis.

In the *dynamic coat*, the chief increase in bulk must occur in the muscular fibre. And the question arises whether this hypertrophy may not, like that of the heart, subsequently present negative fluctuations in size. But in the case of the slower growing elastic fibre the chances are few that there will be any rapid decrease. Any increase in the elastic fibre is thus probably another factor in the permanence of palpability.

Lastly, the *intima* is fortified and thickened, perhaps also permanently; but not in such a degree as to become capable of recognition by the finger.

According to this view, the thickening which renders the artery palpable as a result of normal work is probably not capable of complete removal so far as it belongs to the adventitia and to the elastica; whilst it may conceivably undergo some diminution by a normal involution of some of the unemployed muscular fibres. There is nothing unhealthy or untoward in this permanence or in this mode of regression. Progressive toughening of tissue is ultimately the way of all flesh; but at all ages it is also the indispensable protective accompaniment of hard work. The thickened, but healthy, arterium preserves its everyday nutritional equilibrium; and it remains free from the need for any extraordinary repairs.

The effect of overwork upon the arterium; secondary progressive or "pathological" hypermyotrophy.—Overwork does harm by disturbing the balance between waste and repair. It tells most against those tissues which are slow to build up and slow to repair, such as the intima and the elastic fibre. The local effect is aggravated by the general bodily exhaustion and heart fatigue; and for this the only adequate remedy is sleep, although the horizontal posture in itself and apart from sleep is a valuable instalment of relief.

Thus, whilst normal work stimulates nutrition and growth, overwork is denutritive and wearing, and, by exciting disproportionate efforts at repair, invites destructive changes and much of our arterial disease. Overwork is a relative quantity, determined in each instance by the fluctations in our reserves of rest and of nutritive energy. Moreover, overwork and its results are of three kinds, familiar to us in the everyday of human life, and demonstrable in the laboratory:

Cardio-vascular overwork.	1. Load-overwork. Its results:	(*a*) Structural strain. (*b*) Lesions by violence, *e.g.* rupture of fibre or mechanism.
	2. Time-overwork. Its results:	(*c*) General fatigue and tissue exhaustion. (*d*) Lesions by lowered nutrition, and by tissue devitalisation.
	3. Load overwork with time-overwork. Their combined re-results:	(*e*) Strain, with exhaustion. (*f*) Structural damage, with progressive lesions of decay, after low-organised repair.

In terms of the artery, the third form is slow murder. The second carries the certainty of premature degeneration by inflicting wear, and withholding the normal repair. The first entails heavy risk; but it has at any rate one saving clause, namely, that it need not restrict the time for recuperation.

The "secondary," "progressive," "or "pathological" hypermyotrophy might be regarded as an instance of the development of pathological lesions as the late result of functional disorder, but that there is an abiding toxic factor which originates the irritation at the peripheral end of the circulation, and predisposes the hypertrophied tissues to decay. It occurs in the common cases of granular kidney in conjunction with changes in the adventitia; and also with changes in the intima, which include the early lesions in its capillary extension, and the later lesions in its length throughout the arterial system. We should not lose sight, however, of the significant but still mysterious fact that in *a less usual form of granular kidney,* although the renal atrophy may be extreme, there is *no cardiac hypertrophy and no arterial thickening whatever.*

As a result of the continued operation of the causes which keep up a perpetual high pressure, the cardiac and the arterial hypertrophy no longer run parallel to each other, but enter into conflict. The dilatation which inevitably overtakes the heart throws upon the arterial fibres increased work of calibre regulation, to meet the larger ventricular output. For a while the myarterium continues to thicken, while the myocardium begins to thin: this is a period of great strain, and probably of lesion, for the intima. Finally, the artery too dilates, elongates, and becomes more tortuous, unless defences should have been previously thrown up in the shape of primary calcification, and that the semi-petrified artery should refuse to stretch. The last act in the drama is, according to H. A. Hare, a failure of compensation in the arteriolar district; and this lets loose the flood upon the capillary system at the periphery.

In all this we have mainly considered the vicissitudes of the muscular fibre. Meanwhile, however, the entire arterium has been suffering from overstrain and from toxic malnutrition, and has been carrying out a general attempt at consolidation with inferior materials. And these, at damaged or threatened spots, have been heaped up, and have become conspicuous as patches of arterial disease.

ARTERIAL REST AND OVER-REST.—*The effects of rest upon the arterium.*—The night's rest redeems the day's work; thanks to it, each morning's labour may start with ever-renewed freshness. But the dose of rest must be measured upon the work. "Growing time" must be allowed to arteries as to bodies. There can be no substitute for time in the vegetative process of life.

Arterial rest cannot be complete without the "half-speed" and "half-tension" pulses of sleep in the *arteriæ diastole somni.* In this respect, whisky at bedtime may be a useful "night-cap" for the nerves; but, in so far as it quickens the pulse, it is not the artery's friend. Much more important than frequency is the time-overwork in the matter of the duration of pulse tension. The "arteriæ diastole vigil" has a longer sustained as well as a higher pressure. Hence the supreme importance to the worker of shortening the arterial labour of the day by a sufficient time allowance of sleep. Woe to the artery sentenced, as in renal disease, to the unrelenting hard labour of *intrinsic overwork,* for which there is no perfect "diastole somni," and no shortening of the prolonged pressure within each single wave, even though the arterial systole, which is the time for absolute arterial relaxation, may not be curtailed.

Over-rest for a perfectly normal artery is analogous to prolonged rest in bed for a perfectly sound man: little harm is done to tissue or to function, beyond the loss of that which might have been gained by the stimulus of exercise, and beyond a slight depression in molecular nutrition, or even some slight degeneration.

But the aged are not wisely confined to bed for long. We may take it for granted that an artery kept in full and sound work is not prone to degenerative changes, even if no longer young. But it might be too old to stand successfully the ordeal, more easily borne in youth, of a sudden and continued cessation from the daily routine of toil and sweat.

Obstructive involution and insensible involution.—The latter is the privilege of the athletic hypermyotrophy of youth. Its contrast with the obstructive form witnessed in the athletic hypermyotrophy of age is analogous to the contrast between the imperceptible everyday arterial repair within the healthy arterium, and the extraordinary repairs in arteries damaged or overstrained.

In mature years the danger from the arterial hypermyotrophy attendant upon an artificially raised muscularity consists in the latter's disuse rather than overwork. Unemployment means functional death to the fibre and its calcareous burial. Repose puts an end to that high-pressure intramural pumping which was the health of the arterium. *Stagnation* sets in and soon reads *obstruction.* But "the sweat," meaning of course not only the sensible and insensible perspiration, but excretion in general in all its forms, was also a great part of the health of the artery, by providing for the clearance and sanitation of the nutrient blood, as well as of the blood in transit. "Arma cæstumque repono" has a significance to the retiring man of labour and to the athlete which does not attach to retirement from sedentary work, for this often leads, as in the case of the sempstress, to increased bodily activity. The retired labourer or athlete may thus take a lesson in longevity from those whose arteries have never laboured hard for wages or for sport.

Disease in the Blood Vessel.—The lesions observed in the aorta of rabbits as a result of experimental injections of adrenalin or of tobacco are so definite and so rapid, that they almost resemble the traumatic action of some foreign body. They are merely mentioned as the most remarkable representatives of a group too extensive for our present consideration, that of the *toxic forms* of arterial disease. Not improbably, as recently suggested by Batty Shaw,[1] in them as in various forms of infection, the destructive mechanisms may be of the nature of autolysis.

Outside this group and leaving aside the arterial malformations, and the results of any of the forms of inherited arterial inadequacy (adventitial, intimal, muscular, or elastic), the remaining diseases are essentially perversions of the several attributes and functions of the healthy organism, some form of "wrong living or working."

The greater departures from "physiological rectitude" (Andrew Clark), namely, excess in food, excess in rest, and excess in work, supply the common substratum for the individual failures of the vascular tissues or functions. Some tissues, like the elastic, are more prone to the atrophy of over-use; others, like the muscular, more prone to the atrophy of disuse; but all are liable to suffer from any encumbrance of the blood with over-plentiful supplies, and worse still from any inefficiency of drainage through obstructed lymph spaces and lymphatics. Thus, in the shape of irritation or obstruction, *preverted nutrition* underlies all those changes which are directly determined by *overwork* or *by toxis.*

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[1] Cf. Goulstonian Lectures, 1906.

Again, *mechanical strain* may be the starting-point of disease, even in the intima. The fine adaptability of the delicate lining membrane for every degree of stretch of the media may have become unequal to any extraordinary oscillations at places where some local stiffness or loss of elasticity or some adhesion to the media may have interfered with its easy play. The nodules or patches of repair for any fine cracks may themselves prove a hindrance to perfect working, and may lead up to fresh morbid developments.

THE SENILE ARTERY: ITS ATROPHY OR DISEASE.—*Arterial presenility.*—According to Metchnikoff, all are presenile who die short of patriarchal years. Our usual ideals are rather less lofty. Still, as in most other proverbs, there is probably as much fallacy as truth in the saying, "On a l'âge de ses artères." In practice, I believe, with Sir Hermann Weber, in training up the arteries to last out the man. Predisposition and some forms of inherited arterial delicacy are probably at the root of much of our presenility and premature arterial disease. If these were treated quite early in life instead of at the finish, they might conceivably be influenced for the better.

Arterial senile involution.—The changes of natural decay are not necessarily pathological. Although so often associated with disease, they may evolve mainly on the lines of gradual atrophy. A good many years ago, not feeling satisfied as to the accuracy of the current opinion that age was synonymous with arterio-sclerosis, I began to look in the post-mortem room for old aortas free from any lesions, and I had no difficulty in securing healthy specimens from subjects advanced in years.

There are, however, *pathological forms of senile decay*, old age not being exempt from disease; but these are a special development. The morbid process generally partakes rather of the protective than of the destructive type of arterial disease, and in particular of the dry, massive, non-ulcerative, subendothelial calcification rather than of the moist crumbling ulcerative variety. In relation to the breaking up of diseased arteries, Professor Clifford Allbutt and Professor Hobart Amory Hare have both provided us with an important instalment of that clinical analysis which may ultimately unravel the tangle of arterial disease, and which it is the purpose of this paper to advocate. Professor Allbutt has separated off an "involutionary form of arterio-sclerosis." Clinicians will not fail to recognise this variety. Only the question is how many of the patients consigned to that group on the strength of the combination of a thick artery with normal blood pressure are truly arterio-sclerotic, and not merely hypermyotrophic.

To H. A. Hare we owe the luminous thought that, just as loss of cardiac compensation comes as a climax after a prolonged struggle with peripheral vaso-constriction, so at a yet later stage, under pressure of a dilating cardio-vascular system, the arterioles themselves may break down and lose their power of compensation. *Broken arterial compensation* would thus explain in advanced disease that return of a low arterial pressure, which Allbutt attributes in some of the aged arterio-sclerotics to involutionary changes.

THE PROCESSES OF ARTERIAL REPAIR AND OF ARTERIAL DECAY. —The patch of atheroma formed in the thickness of the intima may be regarded as an attempt to repair some minute rift in the membrane, or to strengthen some weaker spot. The material effused, consisting of loose cells with a quantity of amorphous fibrin, partakes neither of the retractile tendency of a fibrous scar, nor of the rigidity of a callus, but is admirably adapted to the function of the membrane which it consolidates, sharing with the latter the attribute of "stretch," and not opposing its elastic recoil. But there is little vitality in the deposit, and its tendency to undergo necrosis is often directly proportional to its bulk. Rapid softening, disruption, and the formation of an ulcer, which constitute the acute form of degeneration, are not, however, the invariable rule. Some of the deposits, indeed the majority of them in many subjects, do not ulcerate, but remain as permanent patches of thickening. It is probable that in them a gradual process of absorption analogous to the absorption of a callus has kept pace with the fatty metamorphosis, leaving a relatively dry residue unfit for further absorption. The intima remains perfectly smooth and unbroken, even when, as often happens, the nodule becomes further condensed into a dry, concave, calcareous plate. Similar changes are also observed in the thickness of the media, where any slight tendency to fibrosis is better favoured by the conditions of the circulation. We may then venture to distinguish three degrees in the degenerative process—(1) Wholesale softening and ulceration; (2) slow atrophy and slow fatty necrosis, and gradual absorption of the liquefied material, with or without slight collateral fibrosis; and (3) drying up and fixation with more or less calcification of the residue.

The mechanism of calcification itself needs further elucidation. Calcification does not attack the tissues so long as they are in the full activity of life. It is a mode of burial for the dead elements which cannot be removed from among the living. This is well seen in the minute calcareous deposits which occur within and between the cells, picking out the molecules which have suffered necrosis.

The chemical process involved, judging from the result, is mainly a phosphatic reaction, which I venture to think fulfils two purposes at once, that of absorption and that of fixation. There may be at the outset some formation of calcium soaps; but the final product is a precipitation of insoluble tricalcic phosphate, together with small quantities of magnesium phosphate and of calcium carbonate. According to this view, the ubiquitous *soluble monocalcic phosphate* would be converted by contact with dead matter into the *insoluble tricalcic phosphate,* a molecule of phosphoric acid being split off to form with the alkaline products of decomposition a soluble combination capable of absorption. Thus the dehydration and the petrification, say, of a dead fœtus, might perhaps be regarded as the two aspects of a single reaction. The same double event of phosphatic liquidation and of phosphatic consolidation would explain not only the extensive *secondary calcifications* apt to accompany the fatty degeneration of atheroma, but also the *primary calcification of the media,* by creeping molecular crystallisations within unemployed and officially dead though not wholly necrosed muscular fibres.

Clinically, the contrast between these two forms of calcification is of practical interest in prognosis, the secondary being part of a destructive, whilst the primary is part of a consolidating process much less prone to ulceration, as witnessed by the often remarkable prolongation of life in spite of advanced arterial calcification.

Another clinical view which may guide pathological inquiry, is the obvious influence of stagnation in promoting intramural obstructions and in impeding their removal. The lymphatics are probably at fault; if their channel should have remained clear their stream must have lost its power.

SUMMARY.—The burden of the foregoing remarks may be briefly summed up:

1. The study of vascular disease has not yet fairly reached a stage for generalisations. For the present the requirement seems to be a painstaking elaboration of the elements.

2. To this end is much to be desired an adequate nomenclature, complete as well as accurate.

3. Uniformity in terminology is a first essential in an inquiry which necessitates the systematic collaboration of the physiologist, of the pathologist, of the pathological anatomist, and of the clinician.

4. Pathological anatomy has hitherto done most for us. But its scope is limited to the final results, and does not afford an insight into the origin and the evolution of disease. More physiology and more experimental pathology are wanted. But clinical study, which has been the last to take the field, is the only section which commands the material for a complete survey.

5. The prevailing tendency to merge divergent types under one title may have its justification in the complex interactions of the morbid factors, but it is not conducive to progress. "Arteriosclerosis" is too large a heading for the practical purposes of clinical definition. Analysis in clinical observation and research would be more profitable than this synthesis borrowed from the terminal combinations of anatomical lesions.

6. An urgent requirement is a better distinction between the functional group of arterial diseases and the structural. The worst of our clinical difficulties is our present helplessness to identify *simulated "arterio-sclerosis"* on the one hand, and "true arterio-sclerosis" on the other, by unmistakable clinical characteristics.

7. Subject-matter so varied is best dealt with *in compartments.* The lead was taken in this direction by Gull and Sutton's brilliant investigations into the morbid changes in the arterio-capillary district in advanced renal disease; and George Johnson's name is identified with the chief theory as to the function of arterioles.

(*a*) The all-important *capillary circulation* had seemed to be almost inaccessible to clinical inquiry. Recently, however, fresh avenues of thought and experiment have been opened in connection with the histo-capillary interchanges, their physiology in the normal circulation of tissue lymph, and their pathology in the various types of œdema. Practical methods have already been proposed by George Oliver, which are likely to promote the clinical study of the vital processes at their headquarters under the influence of increased, of diminished, or of interrupted circulation.

(*b*) *The arterioles* may also at no distant future become the object of special clinical observations analogous to those for instance of the pupil. Methods have still to be devised. Electricity may probably be of use in this direction. Its various currents are at present applied with reckless liberality to the most delicate of our mechanisms, in complete ignorance of the nature for good or evil of any permanent impression upon the tissues systematically submitted to their influence.

(*c*) *The sphygmology of the long arteries* is by no means exhausted. Happily some of them are more easy of approach, and they present for joint study not only the intima which in the capillary is isolated and naked, the muscular element which predominates in the arteriole, but the elastic tissue which is the chief constituent of the aorta. Their behaviour and that of the pulse wave and of the pulse pressure within them may be taken as some general expression or resultant of the various more or less divergent or conflicting forces at work up and down the cardio-vascular system; but very erroneous conclusions might be based upon their isolated contemplation.

(*d*) *The aorta* is in itself a separate study of individual importance in all cases of arterio-sclerosis,—some presenting a smooth, elastic aorta even when considerable disease occurs in sundry peripheral arteries, others a much diseased though not quite inelastic, and others again a rigid, dilated, and paralysed aorta.

A clinical localisation of the aortic disease, as to its situation on the cardiac or on the distal side of the carotids, is also of great practical importance.

Fatty degeneration with thinning of the aorta, but without any loss of elasticity, may be traced in cases of pure alcoholic malnutrition to a continued *cardiac over-activity in the unloaded state*, which exercises the elastic fibre without overstraining it, whilst long intervals of sleep give it ample rest. This form of chronic arterial disease is not represented in our nomenclature, and does not fit under the general heading of "arterio-sclerosis."

Other aortic conditions, in particular the large group of the infective lesions, a review of which has to be unavoidably neglected, are also suited for separate description and clinical study.

8. Further compartments of clinical study have of late years been defined in connection with the local distributions of arterial disease in the various departmental systems of the circulation, in their regional relations to a mechanical and to a toxic etiology. The clinical importance of this study is suggested for instance by the anomaly that, whereas the organic incidence of arterial disease is, rightly perhaps, attributed to organic overwork, cerebral hæmorrhage overtakes the unintellectual labourer as well as the brain-worn student under the levelling influence of granular kidney,—in other words, of perversion of the general vital processes and of the plasma.

9. Lastly, *the arterial wall* or *arterium* itself offers opportunities for analytical study which have not yet been fully worked out. Yet more of practical physiology should be introduced into our tactile sphygmology. The mere systolic and the mere average blood pressure, the mere palpability of the artery, the hardness or roughness of its surface,—are not, taken alone, trustworthy guides. The finger must study the three physiological attributes of the arterial wall in each individual radial artery: the degree of thickness of the adventitia, the degree of tone of the media, and above all the degree of elastic swing which, when it is ample, tells us of a healthy aorta as well as of a healthy periphery, with the added inference that, as to nutrition, all is well within the arterium—a good food supply, good lymphatic drainage, and enough of diastolic rest.

BLASTOMYCOSIS OF THE SKIN IN MAN.

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(Plates I. and II.)

The yeast fungus is claimed to be responsible for the production of this remarkable and rare affection of the skin. The case now placed on record is a typical example of the malady, and illustrates particularly well the characteristic skin lesions. That the skin may be invaded by a blastomyces and thus become the seat of a peculiar inflammatory process was demonstrated for the first time only a few years ago. The early investigations were carried out by Buschke and Busse in Germany, and by Gilchrist in Baltimore. Gilchrist was the first to suggest the name "blastomycetic dermatitis" for the disease. There has been a comparatively large number of cases reported from Chicago, so much so that it has actually been called "The Chicago Disease"; careful inquiry into the cause of its prevalence in that city has failed to elicit any satisfactory explanation of the fact. Of late, too, the disease appears to have been attended by an increasing tendency towards a fatal termination in Chicago; this also is inexplicable.

The lesions, as they manifest themselves in the skin, are characterised by papillomatous elevations from the surface exuding a sero-purulent discharge; the exudate dries and forms crusts. The disease with which blastomycosis of the skin is most likely to be confused is verrucose tuberculosis. The diagnosis is readily confirmed by microscopic examination of the exudate or by cultures and animal inoculations. Whilst the disease has been most frequently recognised as a skin lesion, it is also capable of systemic infection. Thus Eisendrath and Ormsby, in October of last year, put on record a case of systemic blastomycosis with blastomyces in the sputum, and these authors had collected from the literature four other cases of systemic infection. They found that the disease had been described in the following localities, namely, larynx, trachea, lungs, pleura, myocardium, liver, spleen, pancreas, kidneys, adrenals, mesentery, lymph glands, bones, joints, subcutaneous and cutaneous tissues.

Bassoe, in March 1906, reports a case of disseminated blastomycosis from the Rush Pathological Laboratory, Chicago. This is the fifth case of general infection to be reported from Chicago since 1902. The parts involved were the lungs, lumbar vertebræ, and subcutaneous tissues, with multiple abscesses and fistulæ and extensive amyloid degeneration. The case proved fatal.

In the systemic affection the disease may resemble a pyæmia, or at times is with difficulty distinguished from tuberculosis. Miliary tubercles may be found in the lungs, liver, and elsewhere which bear a close resemblance microscopically to the miliary tubercles of tuberculosis. In two of the reported cases the lungs seemed to have been the first point of attack. Evans places on record a most interesting case of cutaneous blastomycosis which was produced by accidental inoculation. A physician, æt. 28, was performing an autopsy on a case of systemic blastomycosis when he accidentally inflicted a very slight skin wound with the point of a needle on the palmar surface of the left index finger. At the end of a week a pustule formed, and in the course of a few weeks a typical lesion of blastomycosis had developed at the point of inoculation, and another on the back of the hand. Evans finds that the disease, in the reported cases, is confined almost solely to those individuals who are performing manual labour and working out-of-doors, and that the lesions are more numerous on the hands, arms, face, and lower extremities. He also calls attention to the fact that he had not found any case reported previously of the disease affecting the palmar or plantar surfaces. The case which I record in this article, however, presented a lesion on the thenar eminence; curiously enough this lesion was the only one of the fourteen, existing in my patient, which showed a tendency to spontaneous recovery.

Iodide of potash has proved almost a specific in this malady; its effect is well illustrated in the case which I record. It is apparently advantageously combined with curettement and the exposure of the lesions to the X-rays. The history of the case which I have to report is as follows:—

Case.—T. B. D., æt. 28, was referred to me on the 26th of July 1901 suffering from multiple tumours of the face, shoulders, and neck. He stated that the disease had appeared six months previously, when the trouble made itself evident on the tip of the right shoulder. A month subsequently it appeared on the right malar bone, and within a few weeks it manifested itself in isolated patches in other localities: thus a patch occurred at the inner angle of the eye and the right side of the nose; then one on the palm of the hand and another on the right thenar eminence: it then appeared on the upper lip and the root of the nose anteriorly. Within two months, patches had occurred at the following points: the left side of the neck, left popliteal space, and the back of the right thigh just below the gluteal fold.

Previous history of the patient.—He was born in Yorkshire, England, but came to Canada eighteen years ago; since that time he has lived in Toronto with the exception of three years which he spent in Chicago, from 1897 to 1900. For two years he worked as a "lineman" in the employ of the Bell Telephone Company, continuing in this employment until last November, when he stopped work, and he has done nothing since. Three years ago in Chicago he had scarlet fever; he has never had any other serious illness. There is no history of syphilis or gonorrhœa. As to tuberculosis, the only history I could elicit after careful inquiry was the fact that one paternal uncle died of consumption. His father and mother are living and healthy. The patient is one of a family of three brothers and two sisters. One sister died of "tonsillitis" at 6½ years of age, and one brother died when 1 month old, the cause unknown; the others are all living and healthy. He has been married four years and a half; his wife has never had any children, nor has she had any miscarriages.

The patient is a man of dark complexion, and, were it not for the lesions which I am about to describe, he appeared to be in good health —a strong, well-developed man. A description of one of these lesions may be given in detail, and individual peculiarities appearing in different patches will be pointed out afterwards. A patch existed on the upper lip, which, on superficial inspection, resembled an epithelioma (*vide* Plate I.). Epithelioma of the upper lip is extremely rare, except as an extension from an affection of the lower lip; but, apart from this, it was apparent on close examination that the characteristics presented were not in reality those of epithelioma. The patch was situated near the central portion of the lip; it was 3 cms. broad and 2 cms. from above downwards. It extended from the centre of the red free margin of the lip upwards on to the free skin surface. The growth projected from 3 to 4 mm. from the surface of the lip. The surface presented a warty appearance of a dirty yellowish white colour, with some spots of darker hue, apparently due to ecchymoses. There was no hard base at the margin; in fact, the growth stopped abruptly, and the surrounding tissues were not perceptibly indurated. This appeared evident, too, on grasping the growth between one's fingers and raising it up, when the deeper parts appeared perfectly normal in consistence. It was found, however, that the affected part was somewhat tender on manipulation. The surface secretion tended to dry and to become hard and to form crusts, and at times the secretion had a foul odour. An oval patch existed at the root of the neck anteriorly, immediately to the right of the middle line, 3½ cms. in its transverse diameter and 2½ cms. vertically. The surface of this resembled that already described on the upper lip, but the surrounding skin presented a narrow border, red and hyperæmic, mapped out with very definite limitations about the growth. The skin of this reddened border was somewhat desiccated in appearance, and presented here and there a few scales. Beyond this sharply defined border there was a slight hyperæmia of the skin, extending further out and gradually fading into the normal colour. There were in all fourteen lesions, which I now enumerate in the order in which they appeared, and indicate at the same time the size of the various growths:—

No. 1.	Tip of the right shoulder . . .	4½ cms. by 2½ cms.
No. 2.	Right cheek, 4 cms. in front of the external auditory meatus	1 cm. in diameter.
No. 3.	Right cheek, directly above No. 2 . .	1 ,, by 1½ cm.
No. 4.	At base of right thenar eminence . .	1½ ,, ,, 1 ,,
No. 5.	Between the inner canthus of right eye and nose	4½ cms. ,, 3½ cms.
No. 6.	On the dorsal aspect of the interphalangeal joint of the right thumb . . .	2 ,, ,, 2¼ ,,
No. 7.	At the root of the neck anteriorly . .	3½ ,, ,, 2½ ,,
No. 8.	On the upper lip	3 ,, ,, 2 ,,
No. 9.	Back of the right thigh, just below the gluteal fold	2 ,, ,, 1 cm.
No. 10.	Inner aspect of the left leg, just below the tibial attachment of the semi-tendinosus tendon	2 ,, ,, 1 ,,
No. 11.	On the inner aspect of the lower third of the left thigh	½ cm. in diameter.
No. 12.	On the left side of the neck, 3½ cms. behind and below the angle of the jaw . .	1½ ,, ,,
No. 13.	On the back of the neck, 4 cms. to the left of the vertebra prominens . .	1¼ ,, ,,
No. 14.	On the back of the middle of the right arm .	½ ,, ,,

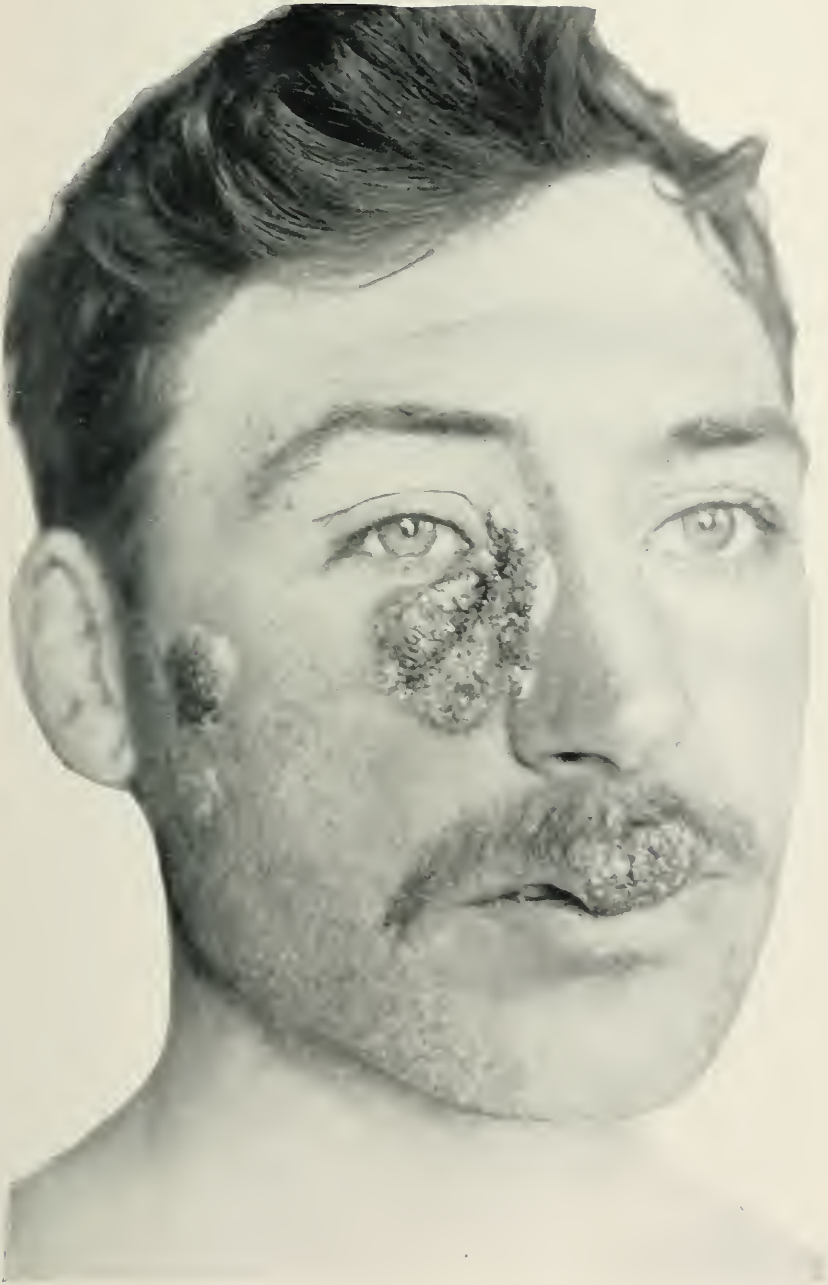
The two lesions described on the right cheek were connected by a ridge of hardened desiccated skin 3 cms. long. The lesion near the inner canthus of the eye extended right up to the margin of the lid, but stopped abruptly there, and did not invade the conjunctival tissue. The surface of all the patches presented very much the same characters, with the exception that at some points the secretion had been allowed to dry and to form crusts of a dirty yellow colour, whilst at other points these crusts had been removed, and there was left a surface having irregular red papilliform vegetations scattered over it, with here and there the dark hæmorrhagic punctiform areas already described. The occurrence of the narrow red ring surrounding the patch at the root of the neck, which I have described above, is evidently of accidental occurrence, and is not an essential part of the lesion. In fact, this was only marked in one other locality, namely, that over the right shoulder. One is inclined to believe that it is due to the irritation of the clothes, and was therefore most noticeable where the friction of the clothing would most easily produce such a result. The growth over the thenar eminence possessed particular interest, in the fact that it alone of all the lesions showed signs of having undergone a retrograde change, and was, in fact, practically cured. The elevated vegetations present elsewhere were entirely absent; the patch was merely represented by a thickening of the epidermis, somewhat desiccated, with a few scales on the surface. In this patch, therefore, spontaneous cure had occurred. The patient states that all the growths appeared to be increasing until about two months ago, but since that time he has not noticed any perceptible change in them. The only treatment he had received for the disease was that on two occasions the growths on the cheek and that near the right eye had been burnt with caustic, but with no beneficial effect.

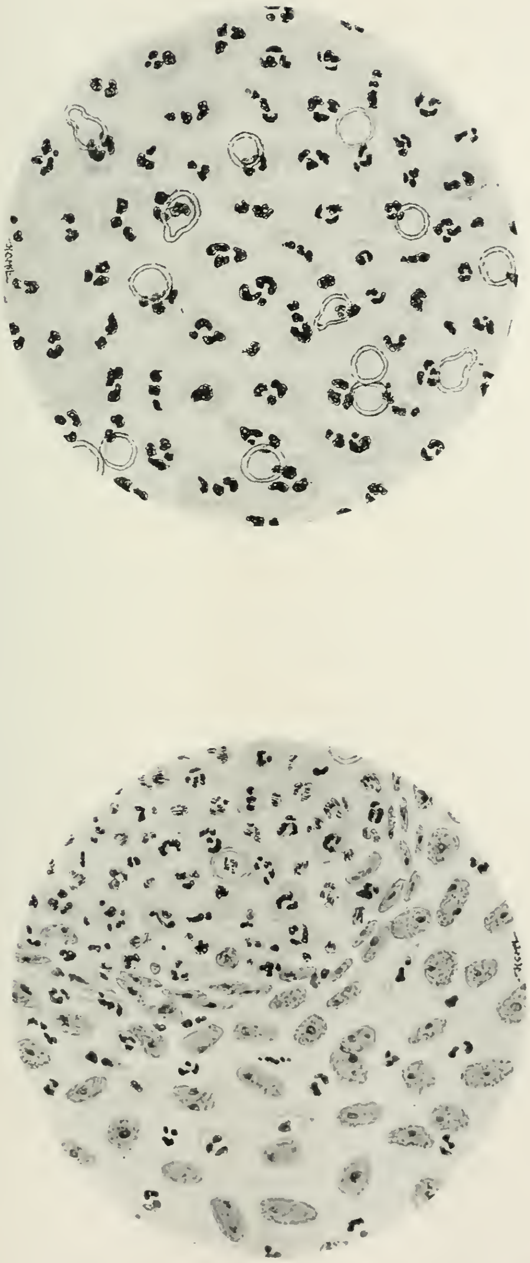
The patient was admitted to St. Michael's Hospital. Some of the scrapings from the surface of one of the patches were examined under the microscope, having been teased out in a little liquor potassæ. The characteristic blastomycetes were easily demonstrated among broken-down epithelial cells, leucocytes, and granular débris. These organisms were found as round, highly refractile, double-contoured bodies.

The diagnosis of the condition was thus established very readily, and the following treatment was adopted. Chloroform was administered, and the mass at the root of the neck anteriorly was excised with the knife, and the edges of the wound united by catgut suture. The one on the tip of the right shoulder was similarly treated. All the other lesions were simply curretted with a Volkmann's spoon, and the surfaces touched with a Pacquelin's cautery. A portion of the patch near the right eye was somewhat more prominent than the remaining part of the patch, and this was found to contain a bead of pus. One found at the operation that the crusts, elsewhere described, could easily be detached by the finger-nail, and that under them a characteristic warty granular surface was left. This surface might be described as coarsely granular, each elevation being conical or almost filiform in shape, and the whole surface when the crusts were freshly removed presented a clear red, somewhat angry colour. When this granular surface was in turn scraped off, a perfectly smooth base was left, and it was to this the Pacquelin's cautery was applied. After the operation a simple surgical dressing was applied, and iodide of potash was prescribed in large doses; beginning with 20 grs. thrice daily, the amount was rapidly increased to a drachm three times a day. A very slight degree of iodide rash was produced, but gave rise to no trouble, and did not necessitate a discontinuance of the drug. At the end of a month the lesions had practically disappeared. The two localities where excision had been performed healed kindly, as did also the surfaces where curettement had been done; so that the note made twenty-nine days after operation states that there was little to be seen of the various patches save redness and some slight induration. These indications, however, were so slightly marked that they were not observable at a little distance, and only showed up on fairly close inspection. He left the hospital, and suffered no further until three and a half months subsequently, when he presented himself with a patch of characteristic appearance on the left side of the neck, about the size of a ten-cent piece. I prescribed iodide of potash, and applied Lassar's paste locally. The patch rapidly disappeared, and he remained entirely free from the trouble for some time.

The lesion which was excised was examined microscopically, and presented the following appearances (*vide* Plate II.). The base of the ulcer showed considerable hyperplasia of the epithelium, and between the epithelial cells were many leucocytes. The papillæ were much congested and infiltrated with polymorphonuclear leucocytes. In places small abscesses had formed, and within their cavities, between the leucocytes, blastomyces were found and recognised by their clear centres and double contour. They were not numerous, and could not be found outside of the abscesses. In the papillæ in close proximity to the abscesses, granulation tissue with giant cells and epithelioid cells similar to those found in tuberculosis were seen.

The patient was lost sight of until nearly four years had elapsed. He presented himself on the 5th June 1905 with a patch of characteristic appearance on the left side of his neck. This corresponded to "No. 12" in the above list of lesions, and it was here recurrence occurred three and a half months after his first treatment. The patient informed me that all the other lesions had long since ceased to trouble him. In fact there had been no recurrence excepting in this one locality since the treatment had been discontinued in 1901. The lesion on the left side of the neck, however, would largely disappear under the administration of iodide of potash, but would recur from time to time. He had become discouraged about it, and came to me for advice. I again sent him into hospital, and excised the lesion completely. I also performed a plastic operation for ectropion, as the scar at





Drawings made from a section through a small abscess in the excised tissue. × 1000.

the inner canthus of the right eyelid had caused an eversion of the lid and led to epiphora. He has had no recurrence, and I believe he is now permanently free from his trouble.

Bevan of Chicago suggests the value of copper salts in the treatment both of actinomycosis and blastomycosis. He quotes certain French chemists as authority for the statement that copper sulphate can be used in doses of from 2 to 8 grs. a day, for six months at a time, without any deleterious effects to the individual. In a case of blastomycosis extensively affecting both hands he administered this drug in $\frac{1}{4}$-gr. doses thrice daily, and later $\frac{1}{2}$-gr. thrice daily; a copper sulphate wash of 1 per cent. solution was applied locally. Under this treatment the lesions in Bevan's case had greatly improved, but at the time of making the report had not entirely disappeared.

It may be of some special interest to note that hitherto the disease has been almost wholly confined to the United States, and indeed my patient lived in Chicago immediately prior to his attack, and may have contracted the infection there. Shepherd described two cases in Canada in 1902, and one case is reported in Great Britain. It is difficult to explain the occurrence of so many cases in the United States, and the restriction of a comparatively large number of these to Chicago.

While it is claimed that blastomycosis is a disease caused by the yeast fungus, we must remember that in all probability there are different varieties of the yeast family, some of which may be pathogenic when introduced into the tissues of man, and some which cannot be so regarded. It is possible, too, that different forms of the organism may produce diseases of a different type. Thus Montgomery of California in 1900 described a disease which was apparently restricted to the San Joaquin Valley, a valley which opens out into San Francisco Bay. Four cases in all were referred to, including the case which Montgomery had under his own observation. In the San Joaquin Valley disease with circumscribed nodules occurred in the skin; these ulcerated, and the exudate from the surface produced a thick scab. On microscopic examination of the nodules removed from the skin, there was found granulation tissue composed of small round cells, with rosary giant cells and numbers of small abscesses scattered through it. I had the opportunity of examining some of these sections which had been sent by Dr. Montgomery to my colleague, Professor A. B. Macallum, and on comparing the tissue from Montgomery's case with that from my patient there are to be observed some striking differences.

In the first place, the distribution of the micro-organisms was very different in the two cases; these were found in the giant cells and also scattered free in the granulation tissue, and very rarely in the abscesses in Montgomery's case, whilst in sections from my patient the organisms were practically restricted to the abscesses, and were not found in the organised tissues. Furthermore, whilst the characteristic organisms with a clear capsule and double contour were present in both cases, it was found that in Montgomery's case these bodies exhibited a spore formation of an endogenous character, the capsule being filled with a number of small spherules; in some cases the capsule had broken, and the spores were seen escaping from it. In my case no such spore formation could be found; the organisms here and there were budding, but the capsules always contained simple undifferentiated protoplasm. Thus it would appear that these two diseases which are so similar in many respects show a marked dissimilarity in the appearance of the affected tissues and the relation of the micro-organisms to those tissues. These observations suggest either that there are different forms of organism responsible for different forms of disease, or that blastomycetes may behave differently under different conditions, at one time producing endogenous spores, and at others exhibiting division by budding. Or again, these organisms may in one phase of their development be found embedded in the tissues, and at others free in the abscesses which have formed at the seat of disease.

The relation of blastomycetes to tumour formation has been studied somewhat extensively of late years; the tendency is to agree with the conclusions of Kovatscheva, who finds that, whilst the blastomycetes may be the cause of the lesion, as it would undoubtedly seem to be in blastomycetic dermatitis, it may on the other hand be of quite accidental occurrence in tissues which are the seat of pathological change from other causes. In true carcinomata and sarcomata blastomycetes are occasionally found.

I wish to record my indebtedness to my colleague, Dr. Graham Chambers, who was associated with me in the treatment of my patient, and who indeed first suggested the diagnosis of blastomycosis; also to my colleague, Dr. E. E. King, who made the very excellent photograph of the patient published herewith; and to Dr. H. C. M‘Lean, who is responsible for the very faithful drawings of the appearances observed under the microscope in the sections of the excised tissues.

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OBSERVATIONS ON PERFORATED GASTRIC AND DUODENAL ULCER, BASED ON A PERSONAL EXPERIENCE OF FORTY-SIX CASES OPERATED UPON.[1]

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(*Continued from page* 117.)

The etiology and morbid anatomy of perforated ulcers of the stomach and duodenum having been considered in the previous section, the more purely clinical aspects of these conditions may now receive attention.

Clinical Features.—It is important to discriminate clearly between the symptoms which come on immediately on the giving way of the ulcer and those which ensue later as a result of infection of the peritoneal cavity. The former present certain features which are characteristic of perforation of the stomach or duodenum, and are helpful in diagnosis; the latter are common to nearly all forms of acute infective peritonitis, and are therefore only of diagnostic value in the light of what preceded them.

Pain.—The most striking, constant, and characteristic symptom of the occurrence of perforation is the sudden onset of intense abdominal pain, which is variously described by different patients as of a stabbing, cutting, tearing, burning, or twisting character. It is always of extreme severity, doubling the patient up, causing him to writhe in agony, and usually to cry out. The initial pain, as a rule, radiates all over the abdomen, and the patient indicates its site by sweeping the hand across the belly or round the umbilical region. Only in two of my cases have I been able definitely to elicit a history of pain referred through to the back, between the shoulders. I have not observed that radiation of pain towards the clavicular region to which Adamson and Renton (14) have drawn attention. In most cases there is an area, situated in the epigastrium or in one or other hypochondrium, in which the pain reaches its maximum intensity.

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In a few instances, both in gastric and duodenal cases, the pain is specially referred to the right iliac fossa, and this may lead to an erroneous diagnosis of appendicitis. I have twice been misled in this way, and have cut down over the cæcum only to find the appendix normal. In one of these cases, that of a man (John B.), æt. 20, the patient was so definite in his statement that the pain was, and always had been, most severe in the right iliac fossa, and the tenderness was so much more marked there than elsewhere, that I revised my original diagnosis and exposed the appendix.

In most cases, after having lasted for a period varying from half an hour to about two hours, this overpowering pain gradually eases off, and the patient experiences a sense of relief, tempered, however, by the feeling that at any moment the suffering may be renewed.

The whole abdomen remains tender to touch, and by careful palpation an area in which the tenderness is most marked can generally be delimited, and this is usually found to correspond with the position in which the initial pain was most severe. In the majority of cases even light pressure cannot be borne over the abdomen, the muscles of which are tightly braced up, but several of my patients stated that bending forward and compressing the abdomen relieved their pain.

Apart from the general tenderness of the abdomen, I have not observed the excessive tenderness of the supra-pubic region referred to by Mr. Caird.

I have found a remarkable correspondence between the site of the maximum tenderness and the seat of the perforation. When the most tender area was in the left hypochondrium, the perforation has almost invariably been towards the cardiac end of the stomach; when around the umbilicus, in the body of the stomach; and when in the right hypochondrium, near the pyloric end, or in the duodenum. So constant is this association, that I have come to rely upon it as a guide to the site of incision.

Vomiting.—Vomiting is by no means a constant symptom at the onset of perforation. In eight of my *gastric* cases I have no note regarding this point. Of the remaining twenty-eight, ten vomited and eighteen did not. In several of these last, however, the patient felt sick, and in one or two others there was retching, but no actual vomiting. When present, the vomiting was neither profuse nor persistent in any of the cases.

There appears to be considerable variation in the experience of different observers with regard to vomiting at the onset. Thus Roux (1), Dreschfeld, Jaboulay and Viannay (15) consider it a rare symptom; Brunner (2) estimates that it occurs in about a third of the cases; while Broadbent, Caird, and Stawell have found it commonly present.

In the *duodenal* cases in which I have a note on this point, only two vomited, and in both the sickness persisted and was accompanied by hiccough; one recovered, and one died. Seven of the patients did not vomit.

Abdominal rigidity.—Rigidity with retraction of the abdominal walls is one of the earliest and most constant symptoms. Usually within a very few minutes of the onset of pain the reflex or protective contraction of the parietal muscles and of the diaphragm renders the walls so tense that it is impossible to palpate the abdominal contents, and the movements of respiration are carried out entirely by the thoracic muscles. While rigidity is a symptom common to many acute abdominal conditions associated with infection of the peritoneum, it occurs earlier, I think, more rapidly becomes general, and is more pronounced, in cases of gastric or duodenal perforation than in almost any others. When much free gas is present in the peritoneal cavity, there is sometimes ballooning of the abdomen.

With the advance of peritonitis, the rigidity becomes even more marked, but the retraction gives place to distension, which may be due to accumulation of free gas in the peritoneal cavity, or to tympanitic distension of the intestines.

In one of my cases four hours after perforation had occurred, and in another thirty-six hours after, the lower part of the abdomen continued to move with respiration; and in a third, at the same period the abdominal rigidity had entirely disappeared, and the abdomen was quite flaccid. The latter patient was suffering from a marked degree of toxæmia, and her condition was complicated by the presence of a right-sided pneumonia, of which she died on the fifth day after operation. D'Arcy Power (17) and Poncet (18) have recorded similar cases.

Percussion.—The information obtained by percussion varies widely in different cases, and its value is not always easy to estimate. In many cases the muscular rigidity and the extreme tenderness of the abdomen preclude the possibility of employing percussion.

In early cases, when there is much free gas in the general peritoneal cavity, a characteristically high-pitched, drummy note may be elicited all over the abdomen, so that not only is it impossible to differentiate the hollow viscera from one another, but percussion over the solid viscera yields the same note.

When there is an abundant effusion of peritoneal fluid, the dependent parts of the abdomen may yield a dull note on percussion.

In one of my cases, that of a young woman (E. B.), æt. 30, a well-defined area of dulness could be recognised extending from the left hypochondrium, through the umbilical region to the left iliac region, and there was marked tenderness on making pressure over this area. The shape and disposition of this dull patch led us to believe that perforation had taken place on the posterior wall of the stomach, and that there was an accumulation of fluid in the lesser peritoneal sac. On opening the abdomen the lesser sac was found distended, and on making an opening through the anterior layer of the gastro-colic omentum a large quantity of turbid yellow fluid escaped. This fluid could be pressed through the foramen of Winslow into the greater sac. The perforation on the posterior wall having been sutured, both peritoneal sacs were washed out and drained, and the patient recovered.

In another girl (E. L.), æt. 20, the area above the transverse colon, including the hepatic area, yielded a high-pitched, drummy note suggestive of free gas in the peritoneal cavity, while the part below the colon yielded a normal intestinal note. On opening the abdomen, free gas was found in the cavity, but no explanation of its limitation to the area above the colon was forthcoming.

Liver dulness.—Considerable importance has been attached by some writers to the loss or diminution of the normal liver dulness in the diagnosis of perforation, but I have found this a sign which it is often difficult to estimate with certainty and to assess with accuracy. Even when, as has happened in a majority of my cases, the area of liver dulness is entirely absent or appreciably diminished, it is not always easy to determine whether this is due to the presence of free gas in the peritoneal cavity, to distension of the intestine, or to displacement of the liver by distended bowel.

When, very soon after the onset of pain, the hepatic area yields a high-pitched note, the presumption is that gas has escaped from a perforation; but when several hours have elapsed, the other possible explanations must be taken into account. After twenty-four hours, the absence of liver dulness has no diagnostic value.

In my experience the liver dulness has been absent more frequently in cases seen a considerable time after perforation than in those seen early, but I cannot trace any constant connection between the time which has elapsed and the absence of the dulness. It was completely lost, for example, in two cases seen within two hours of perforation; while it was still present in other cases in which twenty-three, thirty-six, and forty-three and a half hours had elapsed.

In the *duodenal* cases the liver dulness was lost in patients operated on respectively fifteen, twenty, fifty-six, and sixty hours after perforation; and was present in others operated on three and a half, eleven and a half, eighteen and a half, and fifty hours after.

Nor have I been able to find any connection between the site of the ulcer and the presence or absence of liver dulness. Perforations at all parts of the anterior wall of the stomach have been associated with loss of liver dulness, others with its presence; and even when the perforation has been on the posterior wall, this symptom has varied, as in one case the dulness was completely lost, while in another, almost parallel, case it was unimpaired.

Even the presence of free gas in the peritoneal cavity does not seem to determine a loss of the hepatic dulness, as in several cases the liver area was dull, although a large quantity of gas escaped when the peritoneum was opened.

It would appear, therefore, that while an early absence or marked impairment of the liver dulness is suggestive of perforation, its disappearance later is of little diagnostic significance, while the persistence of the normal dull area in no way negatives a diagnosis of perforation.

Initial shock.—In all cases the onset of the pain which marks the occurrence of perforation is rapidly followed by the development of a condition of profound shock. The pulse becomes small, feeble, and rapid (100 to 120); the temperature falls below normal; the respiration becomes shallow, rapid, and sighing, and, owing to the rigidity of the abdominal muscles, it is entirely thoracic; the face is pale and drawn; the extremities become cold and clammy.

Period of reaction.—In a considerable number of cases, in my experience in the majority, the initial shock gradually passes off, the severity of the pain abates, and after a time the patient both looks and feels much better. The period within which this reaction takes place varies from one to four hours, the improvement sometimes taking place rapidly, sometimes more gradually. In several cases, although the patients had been very ill at the onset, the improvement which accompanied reaction was so great that the friends did not at once send for the doctor, and he was only summoned some hours later when symptoms of peritonitis developed. So marked may the improvement be, that it is sometimes difficult to persuade the patient or the friends that the condition is a serious one. The disappearance of the symptoms may even lead the medical attendant to revise his diagnosis. I have in my mind at least one case in which the doctor in attendance diagnosed perforation within two hours of its occurrence, and arranged for the patient being admitted to hospital, but on his return in an hour to accompany her in the ambulance waggon, he found her so much better that she was not sent in. A few hours later symptoms of general peritonitis developed, and although the patient was eventually operated upon, she succumbed. In another case, in which perforation occurred on the street, the patient was taken direct to hospital and admitted to a medical ward. From the notes there made I find that the original diagnosis of perforated gastric ulcer was set aside in view of the marked improvement which took place within a couple of hours, and as this improvement was maintained for nearly three hours, the patient was on the point of being sent out, when symptoms reappeared somewhat suddenly, and she was at once transferred to the surgical wards. Recovery followed the operation in this case.

It is to be observed, however, that in spite of the general improvement which accompanies this temporary reaction, the pulse becomes progressively more rapid and loses in quality, and this should serve to prevent us being misled.

The importance of clearly recognising the nature of this apparent improvement in the patient's condition is so evident that I need not labour the point.

In some cases there is no distinct reaction from the initial shock, the symptoms of general peritonitis gradually supervene, and the patient passes into a condition of collapse.

I should like here to refer to the question of *the administration of opium* for the relief of the pain which accompanies perforation. It must at once be admitted that it is much easier to declaim *ex cathedra* on the evils of opium in acute abdominal conditions, than to withhold the drug when face to face with a patient in the agonies which attend many of these conditions. To anxious and sympathetic relatives the hackneyed plea that opium "merely masks symptoms," is unconvincing, particularly when all they ask at the moment is that symptoms should be masked.

I shall not here refer to the vexed question of opium in abdominal surgery further than to say, that my statistics regarding its use in cases of perforated gastric and duodenal ulcer clearly indicate that it is attended with very great danger. In thirty-four of my records I have a definite statement regarding opium. In twenty-two of the cases no opium was given; five of the patients died, and seventeen recovered. In twelve in which opium was given, ten died and only two recovered, and in both of those in which recovery took place a definite diagnosis was arrived at, and preparations made for operation, before the opium was administered.

The accompanying table (Table III.) shows the period which elapsed between the occurrence of perforation and the performance of the operation in these cases, and it will be seen that the time factor exercised no more than its usual influence in determining

TABLE III.

A. PERFORATED GASTRIC ULCER.

Cases in which NO OPIUM *was administered*—17.

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
1	4 hours.	1	4 hours.
2	4¼ ,,	2	15 ,,
3	6 ,,	3	18 ,,
4	6½ ,,	4	36 ,,
5	10 ,,		
6	11 ,,		
7	11½ ,,		
8	15 ,,		
9	21 ,,		
10	23 ,,		
11	35 ,,		
12	36 ,,		
13	36 ,,		

Cases in which OPIUM *was administered*—9.

1	1¾ hours.	1	3 hours.
2	8 ,,	2	5 ,,
		3	10 ,,
		4	17 ,,
		5	25 ,,
		6	43½ ,,
		7	96 ,,

B. PERFORATED DUODENAL ULCER.

Cases in which NO OPIUM *was administered*—5.

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
1	2 hours.	1	56 hours.
2	3½ ,,		
3	15 ,,		
4	20 ,,		

Cases in which OPIUM *was administered*—3.

		1	11½ hours.
		2	18½ ,,
		3	2½ days.

the result. Doubtless a considerable time elapsed in some of the fatal cases, but it is fair to assume that, had the patient not been under the influence of opium this period would have been materially curtailed.

It may be a counsel of perfection, but one cannot avoid the inference that in cases of suspected perforation opium should be withheld.

Onset of symptoms of peritonitis.—Sooner or later the apparent improvement which accompanies the reaction from the initial shock ceases, and symptoms of infection of the peritoneum supervene. When the perforation is of some size and situated on the anterior wall of the stomach, and when there are no limiting adhesions, these symptoms are referable to the greater sac of the peritoneal cavity, are early of onset, and rapid in their progress, so that within a few hours the patient has passed into a condition of profound collapse.

Perforation of the posterior wall of the stomach leads to primary infection of the lesser sac, but if the foramen of Winslow is patent, the infective material soon reaches the greater sac. If the foramen has been occluded by adhesions, however, the infection may remain confined to the lesser sac, and eventually result in the formation of a localised abscess.

There is great variation in the time of onset, rapidity of progress, and extent of spread of the peritonitis. Two of my patients were moribund within eighteen hours of perforation, and of the others on whom I operated when *in extremis* the time since perforation varied from twenty-five hours to four days. In one exceptional case perforation was believed to have occurred nine days before. An analysis of my cases has not enabled me to determine the factors upon which the progress of the peritonitis depends. I am unable to confirm the generally accepted opinion that the acuteness of the infection is influenced by the size of the perforation, its situation, the quantity or character of the material which escapes through it, or the state of repletion of the stomach at the moment when perforation occurs. Doubtless each of these factors plays a part, but in addition such circumstances as the general condition of the patient, whether or not he was moved, or has taken food or medicine after the ulcer gave way, and others, have to be taken into account.

The clinical features of the peritonitis which supervenes are similar to those of other forms of perforation peritonitis, and need not be described here. Dudgeon and Sargent (19) have isolated from the edge of all the gastric ulcers they have examined, and from the exudate in a majority of their cases, a strepto-diplococcus, as yet unclassified, of low pathogenic power in the human subject. They quote Ghon, Jensen, and Brunner as having frequently found the pneumococcus present.

TREATMENT.—*Gastric ulcer.*—I know of no qualification to the statement that the only treatment of perforated gastric ulcer is to open the abdomen, close the aperture in the stomach wall, and cleanse the peritoneal cavity. This should be done with the least possible delay, and however advanced the condition may be, the patient should never be denied the chance which an operation affords.

Incision.—It has already been pointed out that the seat of maximum pain and tenderness nearly always corresponds to the site of the perforation, and over this area the incision should be made. Personally, I prefer a vertical incision on one or other side of the middle line, passing between the fibres of the rectus muscle. I have employed transverse and ⊣-shaped incisions, but these are only to be made when access to the area of perforation cannot be obtained through a vertical incision. When the patient is too ill to appreciate degrees of pain or to localise the most tender area, the incision most generally useful is one carried through the inner third of the left rectus. A short incision should first be made to verify the diagnosis. When perforation has occurred, there is often considerable œdema of the extra-peritoneal connective tissue; and when free gas is present in the abdominal cavity the parietal peritoneum usually bulges out into the wound. On dividing the peritoneum the gas escapes with a whistling sound, and often the distended abdominal parietes collapse and become quite flaccid. Seldom has the gas any distinctive odour; but occasionally, in cases of advanced peritonitis, the odour characteristic of the *Bacillus coli* may be detected.

As soon as the diagnosis is thus confirmed, the incision should be enlarged to the extent of 4 or 5 inches, in order to expose thoroughly the region of the perforation. As this is being done, a quantity of fluid, mixed with gas, usually comes bubbling out through the wound. The amount of fluid varies from a few ounces to several pints, but the quantity does not seem to bear any constant relation to the site, size, or character of the perforation, to the previous condition of the stomach with regard to food, nor even to the time which has elapsed since the ulcer gave way. It is true that, as a rule, the quantity is greater in cases in which a considerable time has elapsed, but in some of my earliest cases—operated on within two hours of perforation—several pints of fluid escaped, and the fluid was already distributed all over the abdomen, the pouch of Douglas containing the greater bulk of it.

The fluid varies in character in different cases, sometimes being thin, pale yellow, and slightly turbid; sometimes ochre-coloured and containing flakes of greyish-white lymph; sometimes brownish, as if from admixture with blood. In some of the early *duodenal* cases it has been milky-white, and in others glairy and of a deep orange colour from the presence of bile. In a number of cases the fluid had a distinctly sour smell.

It is remarkable how seldom the fluid contains any recognisable food particles, even in cases where the perforation occurred soon after a meal. The only food particles of a solid nature I have been able to identify have been flakes of curdled milk. In three cases I have recognised castor-oil which had been taken by the patient after the onset of symptoms, and in one case the fluid which escaped smelt strongly of whisky, which also had been taken subsequent to perforation. I cannot avoid the conclusion that in the great majority of cases the stomach contents do not escape in any quantity into the peritoneal cavity.

Finding the perforation.—As a rule, there is little difficulty in finding the perforation. The main obstacle is usually the presence of fluid which fills up the wound and obscures the stomach. If this be swabbed up with gauze or washed away with a stream of saline solution, and the wound then well dried, it will generally be noticed that with each respiratory movement of the abdominal wall more fluid mixed with air comes gurgling up from one region, and here the perforation will be found. Sometimes the position of the aperture may be recognised by the presence of a layer of newly formed grey lymph adherent to the stomach wall, or by recent adhesions between the omentum and the stomach, and it may even be necessary to separate these to expose the opening.

If these guides fail, the anterior wall of the stomach should be systematically examined, passing from the pylorus towards the cardia along the lesser curvature, and then back along the greater curvature to the duodenum, which is in turn carefully investigated. If no perforation is thus found, the gastro-colic omentum should be torn through and the posterior wall examined in the same way. I have never had occasion to open the stomach and explore it from the inside, nor do I think this can often be necessary. From what I have seen, I am inclined to believe that if there is no evidence of an ulcer or of perforation on the surface of the stomach, the diagnosis has probably been wrong, and no good, but rather harm, is likely to follow opening the stomach.

The various forms of perforation met with have already been described. The aperture is generally situated near the centre of an indurated patch in the stomach wall, which marks the site of the ulcer, and when it is exposed a small quantity of pale, glairy mucus mixed with gas is usually seen bubbling from it. In some cases the mucus is bile-stained, particularly in duodenal perforations.

Closure of the perforation.—As soon as the perforation is found, a small plug of iodoform gauze should be packed into it to prevent further escape from the stomach. If possible, the portion of the stomach on which the ulcer is situated should then be pulled well out of the wound and packed round with sterilised gauze wrung out of hot saline solution. Should the stomach contain much fluid or be distended with gas, which is not often the case, it may be emptied by means of a catheter passed through the perforation. In several cases I have washed out the stomach in this way before proceeding to close the perforation.

In the majority of cases it is possible to occlude the perforation completely by an ordinary Czerny-Lembert suture, or by a double row of Lembert sutures, of fine intestinal silk. Over these stitches, an omental graft, which can almost always be readily obtained, should be fixed, to add to the security of the closure. This method I have found on the whole preferable to the purse-string suture, which, on account of the density of the area surrounding the perforation, often fails to pucker up the wall sufficiently to occlude the aperture. In any case, a row of Lembert sutures and an omental graft should be applied over the purse-string suture.

As might be expected from the greater depth of the duodenum, and from its fixation, it is usually more difficult to ensure perfect closure of duodenal perforations than of those in the stomach.

Only in two of my cases have I excised the ulcer.

In one, it was found impossible to invaginate the edges of the perforation, which took the form of a slit about five-eighths of an inch long. The difficulty arose from the fact that the ulcer, which was about the size of a five-shilling piece, and encroached on the lesser curvature and posterior wall of the stomach, was nearly three-quarters of an inch thick and as dense as cartilage. The edges of the gap left after excision of the ulcer were brought together by Czerny-Lembert sutures, and a tag of omentum was grafted over the line of the stitches. The patient died forty-six hours after operation.

In the second case, that of a man æt. 49, on whom I operated when he was *in extremis*, forty-eight hours after perforation had occurred, a thick, indurated ulcer was found close to the pylorus, and it was evident that any attempt to invaginate the edges of the perforation would result in occlusion of the pyloric orifice. Even after the ulcer had been excised and the edges of the gap brought together, the pylorus was so constricted that I hesitated to return it, and performed a posterior gastro-enterostomy. This patient only survived the operation nine hours.

In the case of a man æt. 50, I found that closure of a duodenal perforation narrowed the bowel to such an extent that there was danger of obstruction. I therefore performed a posterior gastro-enterostomy, but without success.

In another case, that of Mrs. K., æt. 36, operated on twenty-one hours after perforation, the ulcer was situated so close to the pylorus that any attempt to invaginate the edges would inevitably have occluded the pyloric orifice. As the patient was too ill to justify prolonging the operation by performing gastro-enterostomy, I slit up the ulcer longitudinally, and, opening out the gap, stitched it at right angles to the long axis of the pylorus, thus performing pyloroplasty. Over the line of sutures I grafted a portion of omentum. This patient recovered.

The same procedure was carried out in a duodenal case in a man æt. 19, fifty-six hours after perforation, but the patient did not recover.

If one might venture to express a general opinion on such limited data, one would suggest—(1) That excision of the ulcer is seldom necessary to secure occlusion of the perforation, and, unless absolutely essential for this purpose, it is not to be recommended. (2) In comparatively few cases is the patient in a condition to justify gastro-enterostomy being performed merely as a precautionary measure against stenosis of the pylorus, or as an additional means of favouring healing of the ulcer, although this operation may be necessary in cases where the closure of the perforation has so encroached on the pyloric orifice that there is a danger of obstruction to the onward flow of the stomach contents. (3) In certain cases pyloroplasty is a simple and efficient alternative to gastro-enterostomy.

Purification of the peritoneal cavity.—Only in one case have I relied upon swabbing with gauze alone for the cleansing of the peritoneum. In this case the perforation was a very minute one, and although six and a half hours had elapsed, the effused fluid was confined to the region of the stomach by recent adhesions. The means adopted was effectual, and the patient recovered.

In three gastric cases and in one duodenal case, the patients being *in extremis*, after closing the perforation and mopping up the excess of fluid with gauze, I have been content to pass large glass tubes filled with iodoform worsted in various directions. This is not a method to be recommended, and it has only been adopted when it was feared that the patient would succumb on the table if more were attempted. These four cases were fatal.

In all my other cases I have freely irrigated the peritoneal cavity with normal saline solution or boiled water. I have invariably made a supra-pubic opening to obtain access to the pelvis, and in almost every case, even the earliest, have found a considerable quantity of turbid yellow fluid in the pouch of Douglas. The apparatus employed is a glass uterine douche tube attached to 4 feet of rubber tubing, and a small glass filler. Large Keith's tubes are passed into the peritoneal cavity in various directions so that the fluid may have free exit, and every corner of the abdomen is systematically washed out. The region of the perforation is usually flushed out first, and next the pouch of Douglas through the supra-pubic opening made for the purpose. The other parts of the abdomen are then systematically explored in the following order:—(1) The left sub-phrenic space; (2) the splenic region; (3) the left iliac fossa; (4) the right sub-phrenic space; (5) the region of the hepatic flexure; (6) the right iliac fossa. Before closing the upper wound, the pouch of Douglas is once more flushed out.

Drainage.—After repeated trials, I have given up draining the region of the perforation, as I have seldom found that anything comes by the tubes left here. If there is doubt as to the security of the stitches in the stomach wall, a cigarette drain of iodoform worsted is passed down to the region of the perforation, and the rest of the wound is closed. This is most often necessary in duodenal cases on account of the greater difficulty in suturing the perforation, and, owing to the more definite and localised area of infection, it is more frequently efficient.

The pouch of Douglas is always drained by means of a large glass tube, similar to a Keith's tube but without the lateral openings, into which tags of omentum are liable to pass, blocking the apertures and preventing the tube being withdrawn. These omental tags are sometimes so firmly fixed that it is necessary to cut them off on the outer side of the tube. To improve the drainage through the glass tube, a few strands of iodoform worsted, preferably in the form of a cigarette drain, should be inserted into it. In most cases the tube may be removed on the second or third day.

I am fully convinced of the value of raising the head of the bed on blocks 6 or 8 inches high, as soon as the patient has recovered from the shock of the operation. I have done this ever since Ryerston Fowler first suggested it, and have found it of the greatest advantage in all cases of general infection of the peritoneum.

Raising the head of the bed on blocks is preferable to propping the patient up with pillows, as the declivity of the pelvis can be maintained constantly, and without effort on the part of the patient.

After-Treatment.—Saline injections—15 to 20 oz.—are given by the rectum every hour or every two hours. In some cases a continuous stream of warm saline solution has been allowed to flow slowly into the rectum from a douche can placed above the head of the bed. In several cases where the shock was severe, and the signs of toxæmia marked, great benefit has followed direct intravenous infusion of saline solution, the cannula being left in position in the vein, and the injections repeated every two hours.

The patient is allowed to wash out the mouth with tepid water from the first, but not to swallow anything for twenty-four hours. After this, sips of warm water or of albumin water are given frequently, and after forty-eight hours, peptonised milk, beef juice, beef jelly, etc., is given in small quantities.

By the end of the first week the patient is having milk food, gruel, porridge, rice-soup, etc.

I cannot avoid feeling that the withholding of food by the mouth in these cases is often overdone, and that the fear of leakage through the perforation is exaggerated. After the operation the stomach is not a dry, empty sac, but contains a considerable quantity of mucus and gastric juice, which is just as likely to leak through our stitches as any fluid we may introduce.

A purgative—4 grs. of calomel or $\frac{1}{2}$ oz. of castor-oil—is usually given on the evening of the fourth day, and is followed by an olive-oil or turpentine enema next morning.

The drainage tube is removed on the second or third day.

I have noticed that, while the epigastric wound usually heals by primary union, in quite a number of cases a small collection of sero-purulent matter forms from the seventh to the tenth day, and requires to be let out. This is not associated with any pyrexia or other sign of absorption, and the small opening soon closes.

Complications.—Only in one case has a *gastric fistula* formed.

It was in a girl (A. T.), æt. 20. The perforation was situated at the pylorus, near the lesser curvature, and the ulcerated area was densely indurated and very difficult to invaginate. As it was felt that the sutures were insecure, a rubber tube surrounded with iodoform worsted was passed down to the region of the perforation. On the third day there was an escape of stomach contents, including some unaltered currants which the patient had eaten two days before perforation occurred. The fistula discharged mucus, gastric juice, and food particles for nearly a week, and then gradually closed. On the ninth day after the operation this patient developed *pneumonia*, which lasted for six days, the temperature ranging from 102° to 104° F., the pulse from 126 to 140, and the respirations from 40 to 52. A week after having her crisis, she developed an *acute parotitis* on the right side, with a rise of temperature to 101° F. In the course of a few days this subsided without going on to suppuration, and the patient eventually recovered.

A girl (J. M'L.), æt. 16, died of *pneumonia* on the fifth day. Another girl (C. F.), æt. 18, had a rise of temperature to 101°·4 F. on the fourth day, which was the beginning of a sharp attack of *bronchitis*, which lasted for four days, and then gradually passed off.

The recovery of another patient (Emily B.), æt. 30, was complicated by an attack of *phlebitis* in the left leg, which began sixteen days after operation, with severe pain and swelling in the calf, attended with rise of temperature (101°·8 F.), and lasted for nine days. In this case the perforation was on the posterior wall of the stomach, and there was an effusion into the lesser sac.

A woman, æt. 55, some weeks after operation developed a large *pelvic abscess*, which was opened and eventually healed.

Prognosis.—The only factor which appears to have any determinable influence on the prognosis, is the period which is allowed to elapse between the occurrence of perforation and the performance of operation. While it is true that early operation does not in all cases avert a fatal issue,—I have lost patients operated upon as early as two, three, and five hours after perforation,—statistical evidence all goes to prove that every hour of delay diminishes the patient's chance of recovery. This point is so evident and so generally recognised, that it need not be dwelt upon. Table IV. shows the interval which elapsed between perforation and operation in my cases.

I have analysed my records to see if any other factor can be traced which appreciably influences the prognosis.

It might be expected, for example, that in *gastric* cases the *condition of the stomach with regard to food* would be of some importance in this connection, and that the prognosis would be less favourable if the stomach were full when perforation occurred. Statements to this effect are frequently made by writers on the subject, but I find no support for them in my experience.

Thus, two of my patients were actually taking a meal when perforation occurred. One vomited everything she had taken but the other did not vomit. Both recovered. Of two in whom perforation occurred immediately after a meal, one recovered, and the other died, and both had vomited at the onset of the symptoms of perforation. There were three cases in which perforation occurred one hour after a meal: two of the patients died, and one recovered. Both of those who died had vomited at the onset. I have no note regarding vomiting in the one who recovered. Of five patients in whom perforation occurred two hours after a meal, four recovered and one died, and in only one of those who recovered had there been vomiting.

Of twelve *gastric* cases, therefore, in which rupture took place within two hours of a meal, and in which presumably the stomach contained a considerable quantity of food, seven recovered and five died, and of those who recovered the majority had not emptied the stomach by vomiting.

If we note the time which elapsed between perforation and operation in those cases which recovered, it becomes evident that the issue was determined by early operation rather than by the condition of the stomach with regard to food, because in five of the seven the operation was performed respectively within two, four, eleven, eleven and a half, and fifteen hours of perforation; in the other two the interval was considerably longer—thirty-five and thirty-six hours respectively. In four of the five fatal cases, on the other hand, the interval was over seventeen hours, namely, seventeen, twenty-seven, thirty-five, and thirty-six hours, and in one it was only five hours.

In the *duodenal* cases it is equally evident that the interval between perforation and operation was the predominant factor in determining the issue, as the following facts show:—

1,	perforation	while	taking	food;		operation	18½	hours after.	Fatal.
1,	,,	1½	hours after	,,		,,	15	,,	Recovery
3,	,,	2	,,	,,	1	,,	3½	,,	,,
					1	,,	20	,,	,,
					1	,,	56	,,	Fatal.
2,	,,	5	,,	,,	1	,,	2	,,	Recovery.
					1	,,	11½	,,	Fatal.
1,	,,	8½	,,	,,		,,	50	,,	,,

An analysis of my whole series shows that *the occurrence of vomiting* or its absence has no appreciable influence on prognosis.

Again, it is frequently stated, that the *size of the perforation* influences the prognosis. It is assumed that through a large aperture more will escape from the stomach, and the peritoneal infection will be correspondingly rapid and severe. At first sight my observations seem to support this view, because it happens that in four of my gastric cases the perforation was large enough to admit the tip of the little finger, and these all proved fatal; while in five cases in which the perforation was so small as only to admit the point of a fine probe, all the patients recovered. The influence of the mere size of the opening, however, becomes less significant when it is noticed that in the fatal cases the interval between perforation and operation was three, fifteen, forty-three and a half, and ninety-six hours respectively; while in the cases which recovered it was four and a quarter, six, six and a half, and twenty-three hours respectively.

In the *duodenal* series also, curiously enough, there were four large perforations, all of which proved fatal; and four small ones, from which recovery took place. Here again, however, the time factor seems to outweight the mere size of the aperture, for in the large perforations the interval between perforation and operation was eighteen and a half, fifty, fifty-six, and sixty hours respectively, while in the small ones it was two, three and a half, fifteen, and twenty hours.

I can suggest no explanation of the unexpected fact that operation seems to be longer delayed in large perforations than in small ones.

Nor does the *situation of the perforation* appear materially to affect the issue. In all situations—at the cardiac end, in the body of the stomach, or near the pylorus—the cases operated on early gave a much larger proportion of recoveries than those in which the operation was delayed.

The unfavourable influence of *opium* administered for the relief of the early symptoms has already been referred to.

Results.—The accompanying tables (Tables IV. and V.) show the results in my series of cases.

In the thirty-six *gastric cases* (Table IV.) there were eighteen recoveries and eighteen deaths—an overhead mortality of 50 per cent.

TABLE IV.—*Results.*

PERFORATED GASTRIC ULCERS.

(*a*) *Cases operated on within Twelve Hours of Perforation.*—16

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
1	1¾ hours.	1	2 hours.
2	3 ,,	2	3 ,,
3	4 ,,	3	5 ,,
4	4¼ ,,	4	10 ,,
5	6 ,,		
6	6 ,,		
7	6½ ,,		
8	6½ ,,		
9	8 ,,		
10	10 ,,		
11	11 ,,		
12	11½ ,,		

(*b*) *Cases operated on between Twelve and Twenty-four Hours of Perforation*—6.

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
1	15 hours.	1	15 hours.
2	21 ,,	2	17 ,,
3	23 ,,	3	18 ,,

(*c*) *Cases operated on between Twenty-four and Thirty-six Hours of Perforation*—6.

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
1	35 hours.	1	25 hours.
2	36 ,,	2	27 ,,
3	36 ,,	3	36 ,,

(*d*) *Cases operated on later than Thirty-six Hours after Perforation*—8.

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
		1	43½ hours.
		2	48 ,,
		3	72 ,,
		4	96 ,,
		5	96 ,,
		6	120 ,,
		7	120 ,,
		8	9 days.

If we deduct those cases in which the patient was evidently dying and the operation was of the nature of a forlorn hope, say those in which the perforation had existed for over thirty-six hours,—and this is considerably beyond the average time allowed by most writers,—it leaves ten fatalities to eighteen recoveries, or a mortality of 35·7 per cent.

It will be observed that of the six patients operated on between twenty-four and thirty-six hours after perforation, three recovered and three died; and of the six operated on between twelve and twenty-four hours, three recovered and three died.

This leaves the cases operated on within twelve hours of perforation—the period within which most writers agree in giving a hopeful prognosis. Of these there were sixteen, with twelve recoveries and four deaths—a mortality of 25 per cent.

There were thus four patients who died within the period in which recovery is to be expected, but against these may be placed six who survived after being operated upon between fifteen and thirty-six hours from the time of perforation.

The results in the ten *duodenal cases* are detailed in Table V. Here also the overhead mortality is 50 per cent.

TABLE V.—*Results.*

PERFORATED DUODENAL ULCERS.

No.	RECOVERY. Interval between Perforation and Operation.	No.	FATAL. Interval between Perforation and Operation.
(a) Cases operated on within Twelve Hours of Perforation—3.			
1	2 hours.	1	11½ hours.
2	3½ ,,		
(b) Cases operated on between Twelve and Twenty-four Hours of Perforation—3.			
1	15 hours.	1	18½ hours.
2	20 ,,		
(c) Cases operated on over Twenty-four Hours after Perforation—4.			
1	14 days. (Operation for sub-phrenic abscess.)	1	50 hours.
		2	56 ,,
		3	60 ,,

Summary of Results.—In Table VI. I have summarised the results of the combined gastric and duodenal cases, showing the percentage mortality at intervals of twelve hours between perforation and operation.

Table VI.—*Summary of Results.*

Gastric cases	36	18 recoveries,	18 fatal.
Duodenal cases	10	5 ,,	5 ,,
Total	46	23	23

	Total.	Recovery.	Fatal.	Mortality.
Operated on within twelve hours of perforation	19	14	5	26·3 per ct.
Operated on between twelve and twenty-four hours of perforation	9	5	4	44·4 ,,
Operated on between twenty-four and thirty-six hours of perforation	6	3	3	50 ,,
Operated on later than thirty-six hours of perforation	12	1	11	91·7 ,,
Total	46	23	23	50 per cent.

No useful purpose is served, I find, by drawing comparisons between these results and those of other individual observers. The limited number of cases which falls to any single surgeon renders the figures available for purposes of statistical comparison useless. So far as I have been able to find, the above is the largest individual experience hitherto reported, and it is interesting to notice that the percentage mortality corresponds as closely as could be expected, considering the disparity in numbers, with the results in 237 cases of perforated gastric ulcer collected by F. and G. Gross. Here are their figures: operated on within twelve hours, 25 per cent. mortality; between twelve and twenty-four hours, 52·7 per cent.; between thirty-six and forty-eight hours, 56 per cent.; over forty-eight hours, 73 per cent.; giving a general mortality of 47·26 per cent.

I would not seek to attach great importance to tables of mortality in considering such operations of urgency as those with which we are now concerned. In the nature of things the death-rate from perforation of the alimentary canal must always remain comparatively high. That it will yet be reduced far below the point at which it now stands I have no doubt, but I would plead that this reduction be effected by operating earlier and oftener in such cases, and by improving our methods, and not by what is euphemistically spoken of as "carefully selecting our cases." In submitting the above record, I would ask the Society to bear in mind that I have never refused to operate on a patient on account of the gravity of his condition. Several of the patients were obviously moribund and were only operated upon to afford what seemed the last remaining chance. Nothing was promised; little expected; hope alone remained; and if I am encouraged to continue to operate on such patients in the last extremity, it is because in more than one case this course has been justified by results.

SUMMARY.—The main conclusions to be drawn from a study of these cases may be summarised as follows:—

1. The liability to perforation appears to be as great in the male as in the female, as, in spite of the greater frequency with which women suffer from ulcer, twenty of my patients were males and twenty-six females.

2. On the whole, perforation occurs at an earlier age in females than in males; and, other things being equal, the younger the patient is, the better seems to be the prognosis.

3. While perforation occasionally occurs in patients who have never hitherto suffered from any digestive disturbance, there is in the great majority of cases a previous history of severe indigestion, and in a considerable number, of ulceration of the stomach or duodenum. Hæmatemesis, however, is a rare antecedent symptom.

4. In a considerable number of my cases symptoms premonitory of perforation were present.

5. No constant factor which would account for the actual rupture of the ulcer can be traced.

6. The site of the *gastric* perforations was on the anterior wall of the stomach in thirty-three cases, and on the posterior wall in three. Of these four were at the cardiac end, fourteen in the body of the stomach, and eighteen towards the pyloric end. Practically all were towards the lesser curvature. All the *duodenal* perforations were in the first part of the duodenum, and, with one exception, on the anterior wall.

7. Only in a single case was there more than one perforation.

8. The size of the perforations varied from that of a pin's head to that of a threepenny piece. In two cases it was in the form of a longitudinal tear. I cannot confirm the statement commonly made that the acuteness of onset, the severity of the symptoms, and the degree and extent of the ensuing peritonitis bear any constant relationship to the size of the perforation.

9. The most characteristic clinical features of perforation are the suddenness of onset and overpowering nature of the pain; the marked abdominal rigidity, and the severe degree of shock.

10. Vomiting is not a common symptom at the onset: it occurred only in twelve out of thirty-seven cases in which the point was noted. I find no evidence for the statement that the

occurrence of vomiting increases the quantity of fluid which escapes into the peritoneal cavity, or adds to the gravity of the prognosis.

11. The information derived by percussion is inconstant and unreliable. Early absence or impairment of the liver dulness is suggestive of perforation; its disappearance later is of no diagnostic value. Persistence of the normal hepatic dulness does not negative a diagnosis of perforation.

12. The situation of the maximum area of pain and of tenderness to pressure forms a reliable guide to the seat of the perforation, and therefore to the site of the incision.

13. The apparent improvement which accompanies the reaction from the initial shock is very deceptive, and frequently accounts for fatal delay in operating.

14. The risk involved in administering opium for the relief of the initial symptoms is illustrated by these figures: in twenty-two cases no opium was given, five patients died, seventeen recovered; in twelve cases opium was given, ten patients died, two recovered.

15. There is no constant relationship traceable between the severity of the peritonitis which ensues and the size or site of the perforation, the quantity or quality of the fluid which escapes from the stomach, the state of repletion of the stomach at the moment of perforation, or any other single factor. Food particles are very seldom recognisable in the fluid found in the peritoneal cavity.

16. In all cases the abdomen should be opened as early as possible, by a vertical incision, passing between the fibres of the rectus, and usually placed over the site of maximum tenderness.

17. It is seldom, if ever, necessary or advisable to open the stomach to find the perforation.

18. An omental graft should be fixed over the line of sutures occluding the perforation, to add to the security of the closure. Leakage is extremely rare.

19. Excision of the ulcer is seldom necessary to secure occlusion of the perforation, and, unless absolutely essential for this purpose, is not to be recommended.

20. In comparatively few cases is the patient in a condition to justify gastro-enterostomy being performed merely as a precautionary measure against stenosis of the pylorus, or as an additional means of favouring healing of the ulcer. If the closure of the ulcer has actually resulted in serious narrowing of the pylorus, gastro-enterostomy should be performed.

21. In certain cases pyloroplasty is a simple and efficient alternative to gastro-enterostomy.

22. The abdomen should usually be washed out, a special opening being made above the pubis for the purification of the pelvis, and for purposes of drainage. To favour drainage the head of the bed should be raised.

23. The free use of saline injections is most beneficial; fluids may be given by the mouth after twenty-four hours.

24. The after-complications I have met with have been, temporary gastric fistula, pneumonia, bronchitis, acute non-suppurative parotitis, phlebitis of the leg, pelvic abscess, subphrenic abscess.

25. The predominant factor in determining the prognosis is the period which is allowed to elapse between the occurrence of perforation and the performance of operation. Every hour of delay diminishes the patient's chance of recovery.

26. The results in my forty-six cases are summarised in Table VI. (page 241).

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THE VALUE OF SODIUM SALICYLATE IN SCARLATINAL ARTHRITIS AND OTHER JOINT INFECTIONS.

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Pain in the joints, sometimes accompanied by synovitis and swelling, occurs not very infrequently during the course of scarlet fever. It may occur during the febrile period or during convalescence, and may be a very trivial matter, lasting only for a day or two, or it may be a troublesome feature of the illness. The term "scarlatinal rheumatism" is most frequently applied to it, but it seems almost certain that in the majority of cases it has no relation to true acute rheumatism, but is due to the specific poison of scarlet fever. In other cases, however, the joint symtoms and rise of temperature, taken along with the marked tendency to

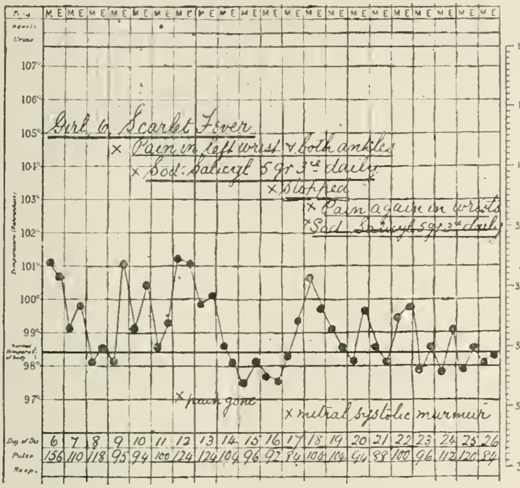

FIG. 1.

endocarditis and the general course of the disease, point unmistakably to an attack of acute rheumatism. This happens with

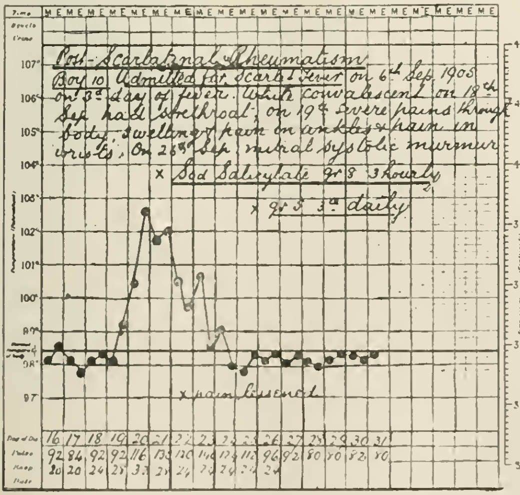

FIG. 2.

such comparative frequency, that one can hardly help concluding that an attack of scarlet fever predisposes to the infection of acute rheumatism; but as our present knowledge gives us no means of clinically identifying the specific pathogenic microbes of either disease, it is impossible to come to any definite conclusion on the subject. As a matter of practice, however, the arthritic complications have to be treated, and the results of treatment throw some light on their nature. Through the kindness of Dr. Murdoch Macdonald and Dr. W. L. Thomson, sixteen cases of scarlatinal rheumatism have been accurately observed for the purpose of testing the therapeutical value of sodium salicylate. In twelve of these the ages of the patients ranged from 6 to 10 years; in the other four, from 17 to 35. The arthritis occurred mostly from the third to the ninth day, but in one on the thirteenth and another on the fourteenth day from the commencement of the illness. In some of the cases there was merely pain; in others, pain with effusion in and around the joints. During the arthritis the temperature varied from 100° to 102°, or rarely 103° F. In five of the cases no treatment was adopted, and the symptoms subsided spontaneously in two, three, four, seven, and eight days; in eleven, sodium salicylate was given in ordinary doses according to the age of the patient, and in these cases the duration was one, one, two, three, five, six, seven, eleven, twelve, thirteen, and seventeen days. Regarded in this way, the untreated cases ran a more favourable course than those which got sodium salicylate. In most of them the arthritis was slight, recovery was apparently spontaneous, and it seemed to be quite immaterial whether the salicylate was given or not. This is in accord with general clinical experience. Here, just as in many other microbic infections, the implication of the

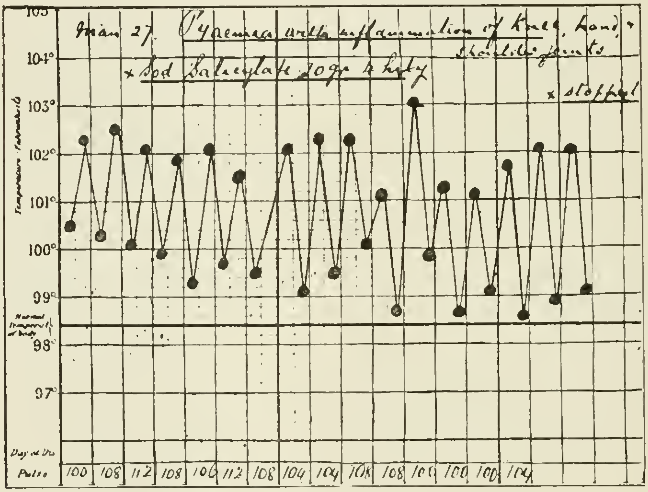

FIG. 3.

joints is to be regarded as part of the general poisoning; and as sodium salicylate exercises no beneficial effect on the general course of scarlet fever, it also leaves untouched the joint affection. While this is true of most cases, in others the results of its action show with apparent clearness that we have to deal with a true rheumatic infection. For example, in Chart 1, pain began on the ninth day, and subsided in forty-eight hours after the salicylate was commenced, the temperature returning to normal and all symptoms disappearing in ninety-six hours. The medicine was discontinued two days later, and almost at once there was a relapse, which yielded to renewed treatment with sodium salicylate. In Chart 2, the course of an undoubted case of acute rheumatism occurring during convalescence from scarlet fever is shown, and it also yielded readily to salicylic treatment. It is only in rheumatic fever that the action of salicylates is specific, and the joints especially are quickly benefited, because the remedy is secreted into them from the blood in considerable amount. In no other infection do they exercise any very appreciable action. In gonorrhœal rheumatism, for instance, when sodium salicylate is given and the joint tapped, the fluid withdrawn shows the presence of salicylate; but it has no action on the arthritis, or on the pain and temperature. The same is true of pyæmic infection of the joints (see Chart 3), of acute rheumatoid arthritis, and of the muscle and joint pains of influenza. In purpura with arthritis, and in chorea, salicylates are of no value, as I have repeatedly found. They have also been extensively tried in malaria, in enteric fever, in phthisis, and in other conditions, but without any benefit. In croupous pneumonia the salicylate is abundantly excreted in the spit, but without affecting the activity of the pneumococcus or the normal course of the disease. In all conditions apart from acute rheumatic infection, its antipyretic and analgesic powers are, for practical purposes, nil. The number of such specific drug remedies is very small—quinine in malaria, mercury in syphilis, benzoic and salicylic acids in acute rheumatism, and perhaps one or two others. They are, however, just as rigidly specific as curative serums, for quinine has little or no effect on most pathogenic organisms inside the body, and the same is true of mercury and salicylic acid.

PERSONAL EXPERIENCE OF POISONING BY CHARCOAL FUMES.

By Robert A. Fleming, M.D., F.R.C.P.E., *Assistant Physician, Royal Infirmary, Edinburgh.*

It is with reluctance that I narrate personal experiences of poisoning by charcoal fumes, but I realise that the story may be of some value to my fellow-practitioners, and may possess a little scientific interest.

For the benefit of those who may read this short note, and do not happen to be familiar with the chemistry of charcoal fumes, I preface the following brief statement. The fumes from a badly ventilated charcoal stove consist of a mixture of carbonic acid, carbonic oxide, aqueous vapour, and air partially consumed or deoxidised. The percentage of the two gases, carbonic acid and carbonic oxide, depends on whether the charcoal burns brightly or simply smoulders, and it seems probable that when the air of the room contains over 5 per cent. of carbonic oxide one of the most dangerous combinations of the two gases has been manufactured.

There are many accounts of the appearances in fatal cases of poisoning by coal gas, water gas, and charcoal fumes; but, so far as I am aware, no medical man has had the opportunity of reporting his personal experiences, or, at least, has taken the trouble to do so.

According to Oliver,[1] the symptoms of water gas (which consists largely of carbonic oxide) or coal gas poisoning are severe headache, giddiness, great throbbing of vessels, with great debility, and later nausea and vomiting. The patient may become drowsy, and later convulsions occur, which may end in coma or death. The pulse is full, the breathing rapid, and the skin dusky red, while sugar or albumin may appear in the urine. The carbonic oxide enters into a close association with the hæmoglobin of the red cells, and the carboxyhæmoglobin causes two absorption bands between Frauenhöffer's lines D and E, the broader being nearer the violet end of the spectrum than the somewhat similar band of oxyhæmoglobin.

In April of this year my wife and I paid a visit to a charming seaport on the south coast of Cornwall. I noticed in the smoking lounge two charcoal stoves, one, which was not in use, connected with the outer air by a metal pipe, and the other, a smaller and portable stove, had a metal pipe, but no attachment to it for carrying off any fumes. All the vapours from this stove passed directly into the air of the room.

The weather being cold, there was some competition for seats near this stove, and my wife and I managed to secure two of these seats on two consecutive evenings. The first night I spent two and a half hours correcting proofs close to the stove, after the other guests had retired to bed; but as the waiter came into the room several times there was no prolonged period during which serious contamination of the air could occur. My only sensation on going upstairs to bed was uncomfortable palpitation, which I put down to over-smoking, and, in addition, I had a severe headache on awakening in the morning, which, however, rapidly passed off.

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[1] See article in Clifford Allbutt's "System of Medicine," vol. ii. p. 961.

The following night we again sat beside the stove, and when my wife retired to bed she twice felt giddy, and had to sit down on the stairs. This I ascribed to a fright when out boating in a rough sea, and consequently I did not hesitate to spend another two and a half hours beside the stove, engaged in correcting proofs. During the latter two hours no one was in the room and no one came in, and there was, I believe, no ventilation, because windows and doors were all closed.

My sensations were mingled. I noticed at first a very disagreeable feeling of choking, suggestive of an incipient pharyngitis and cold in the head; and although this did not pass away, it was followed by a sense of exhilaration, and the work I did that night when seated inhaling the fumes was quite up to my usual standard. When I rose, a few minutes before twelve o'clock, palpitation began, and increased as I climbed up two flights of stairs to bed. By the time I reached my room it was most disagreeable, and was accompanied by singing in the ears. My heart was beating at great speed, but gradually seemed to beat more and more feebly, until two or three minutes after beginning to undress I suddenly lost consciousness and fell on my back on the floor. When I came to myself my wife was bending over me, and I had turned round and was endeavouring to get up. I felt my face was burning, but had no sense of sickness or the clammy feeling which is so commonly associated with an ordinary faint. My wife's account was that I lay on my back, with staring eyes, flushed cheeks, and rapid and noisy breathing, for one or two minutes before regaining consciousness.

With the help of some brandy, I managed with great difficulty to get into bed, and when in bed had repeated attacks, each attack beginning with palpitation and very rapid heart's action, the speed and force soon lessening, and towards the end of each attack I had an overwhelming feeling of impending death. I had in all about a dozen of these, although I did not actually become unconscious again, and in about three hours they gradually passed off. The other symptoms were a severe frontal headache, and after two or three of the attacks a feeling of nausea, although I was never actually sick. I had also a feeling of "air hunger," which, however, was not very urgent.

A neighbouring doctor was sent for, to whom I regret I cannot express my gratitude publicly, because I should thereby disclose the name of the place and the hotel. I fear my appearance, with purplish-red cheeks, suggested dissipated habits, and I was straightly asked how much alcohol I had consumed that day; and my physician's surprise when assured of the very moderate amount I had taken was not unfeigned, until he had seen the stove, and realised the nature of the case. He gave me some strychnine and ammonia, which were helpful.

It took some thirty-six to forty-eight hours to get rid of the effects of the poisoning.

I regret that I did not investigate the urine for a possible glycosuria, and that I had no means of examining the spectrum of my blood. I was most anxious to try oxygen inhalation, only none was available.

In conclusion, besides conveying my thanks to the doctor—notwithstanding his unkind suspicions—I must acknowledge with gratitude the help of guests in adjoining rooms, who rendered assistance in our time of need.

OVARY FREE IN THE PELVIC CAVITY.

By H. G. Melville, Major I.M.S., M.D., F.R.C.S.Ed., *Professor of Pathology, Medical College, Lahore.*

A very unusual abnormality, which would seem to be deserving of record, came to my notice recently.

On the 22nd January 1906, I made a post-mortem examination of the body of an idiot female child, æt. 10, who had died from purulent meningitis two days previously, in the Mayo Hospital, Lahore.

In examining the abdomen, on raising the intestines to view the pelvis, I noticed what appeared to be a foreign body lying in the pouch of Douglas on the left side. It resembled a large well-roasted coffee bean. I removed it with the point of my finger, and observed that it came away freely, being unattached anywhere, that it was smooth and glistening on its surface, and that the peritoneum where it lay appeared to be absolutely normal, and showed no evidences of hyperæmia or inflammation, either recent or of old standing.

A closer examination of the pelvis showed that the uterus was normal, though infantile, that the right ovary was rather large (being 1 in. in length, $\frac{3}{5}$ in. broad, and $\frac{1}{4}$ in. in thickness), and that the left ovary was absent from its usual situation. The Fallopian tubes on both sides were normal, though that on the left side was turned rather more downwards at its outer end than usual. The broad ligament on both sides appeared normal.

The following is a description, naked-eye and microscopic, of the loose body above mentioned: Length, $1\frac{1}{2}$ in.; breadth, $\frac{3}{4}$ in.; thickness, $\frac{1}{2}$ in.

Surface.—Smooth and glistening, apparently covered by peritoneum. On one surface were a few small dark depressions; and, after keeping for a few days in formalin, this surface showed an appearance of cicatricial thickening and irregularity, with points of darker colour, as if some small hæmorrhagic effusion had occurred there.

Colour.—Brown, of a light mahogany shade, resembling a moderately roasted coffee bean.

On section.—The body appeared more or less cystic, with a firm fibrous wall, and semi-solid, rather brittle, contents, which seemed to be attached to the inner surface of the wall, but became separated in making a section of the body. Some, however, continued to adhere. This semi-solid substance appeared to be structureless and granular, and was brown in colour, as if at one time it had been stained by blood pigment.

Microscopically.—The wall, or superficial layer, or cortex of the loose body appeared to be rather homogeneous in character, but in its deeper parts showed some fibrillation and fibrous tissue cells parallel to its surface. It was stained pink by picro-carmine.

The deeper, softer part of the loose body (medulla, or contents, as one may choose to call it) was granular and structureless, and stained a greenish-yellow by picro-carmine, with a few red and pink spots scattered here and there, probably the remains of some different kind of tissue.

REMARKS.—An examination of the broad ligament on the left side showed no signs of cicatrisation there.

No vestige whatever existed of any structure resembling an ovary attached to the broad ligament of the left side; and in the absence of any evidence to account for the presence of a foreign body, the conclusion is that this foreign or loose body represented the left ovary, which had in some way become dislocated and detached.

How this separation of the ovary could have come about must be merely a matter of conjecture. It had evidently been cut off for some time, judging by the completeness of the cicatrisation on the ovarian surface. Arguing also from the colour of the detached body, its staining properties, and its general appearance, it would seem at one time to have been engorged with blood,—and it is not an improbable hypothesis that venous engorgement occurred from strangulation.

The ovary was originally probably larger than normal, like that on the right side, and in consequence would be heavier, and if any abnormality existed in its attachment to the broad ligament, this peritoneal connection might readily become twisted, with consequent venous obstruction, hyperæmia, retention, and necrosis.

The necrosed part in that case would become separated off, but being aseptic would remain *in situ* in the pelvis, in its peritoneal covering, without setting up any irritation, as a foreign body, around itself.

CLINICAL RECORDS.

NOTES ON A CASE OF STRANGULATED HERNIA IN WHICH TWO LOOPS OF SMALL INTESTINE WERE INVOLVED.

By George L. Chiene, M.B., F.R.C.S.Ed., *Assistant Surgeon, Edinburgh Royal Infirmary.*

Having operated nearly a year ago on a case similar to those described by Mr. Hogarth Pringle in the June number of this Journal, I read his article with great interest.

As a supplement to the cases described by him, the following notes may be of interest:—

Case.—The patient, a man æt. 27, had suffered from an inguinal hernia for some years, and had worn a truss, which was ineffective.

The hernia became strangulated, and I saw him about six hours later. By that time the symptoms were acute, and a large, very tense, scrotal swelling was present.

On opening the sac, a large loop of congested small intestine was seen. The anterior wall of the canal was slit up, and when examining the loop of bowel a second similar, but smaller, loop of small intestine was discovered immediately behind it.

Both were pulled down with a view to seeing the condition of the bowel between the loops; but as the connecting portion appeared to be of considerable length, it was thought unadvisable to explore more than about a foot of the bowel at either end of the intermediate portion. Beyond a well-marked congestion, nothing abnormal was found.

The recently strangulated loops, being apparently viable, were reduced, and a Bassini's operation performed. The patient's convalescence was uneventful.

Mr. Pringle lays stress on reducing the posterior loop first. This was done in the above case, as it appeared to me to be easier for the assistant to steady the anterior loop while the posterior was being reduced than *vice versâ*. I was not aware of the difficulty mentioned by Mr. Pringle should an attempt be made to reduce the anterior loop first.

I did not notice any marked difference in the congestion of the two loops, nor did I attempt to examine the intermediate portion of gut with a view to see if it was gangrenous, but simply to examine more fully what appeared to me to be a rare and interesting condition.

A MEDICO-LEGAL CASE.

By J. Dickinson-Leigh, M.D., F.R.C.S.Ed., *Bishop Auckland.*

The case Rex *v.* Laycock, tried at the recent Durham Assizes, is a good example of the difficulty in arriving at a correct opinion which the general practitioner experiences in dealing with head injuries, especially when they become the subject of a legal inquiry. The various text-books on surgery give very little information, even the most recent, and one ultimately falls back on Taylor's "Medical Jurisprudence" with its wealth of cases.

The evidence showed that the deceased, a young married woman, was returning home carrying her baby. She had had some drink, as to the amount the witnesses differed, but she was able to walk. The husband, who was waiting for her, struck her on the face, and she fell on her back; she at once got up; and in turning round, the husband, who by this time had taken the child, caught her with his elbow, and she fell on her face. She again got up, and walked home, a distance of 600 yards. In her pocket, which was at the back of her dress, was a bottle of carbolic acid; the witnesses all agreed that there was no smell of the acid perceived at this time. She reached home about 11 P.M.; the man went to bed, leaving her sitting in the arm-chair in the kitchen near the fire. She was seen there by a neighbour, who spoke to her. Next morning the husband found her on the floor in a dying condition, and with her clothes saturated with carbolic acid. The neighbours heard no noise during the night, and it was proved that the walls were so thin that any noise, such as blows or screams, would have been heard. At the post-mortem examination, the skull was found to be unusually thin over the vault and occipital bone. There was a fracture running from the foramen magnum for 1 inch towards the occipital protuberance. Under the membranes in this position was a small clot about 1 drm. in weight. On section of the brain numerous small hæmorrhagic spots were seen in its substance. For the defence, it was contended that the state of the brain tissue denoted a considerable degree of concussion, and that being so, she could not have sustained the fracture at the time she was knocked down by her husband, as, with concussion, she would not have been able to walk a distance of 600 yards. Attention was called to the fact that the bottle of acid had not been broken at this time, and it was suggested that she had slipped from her chair on to her buttocks, that the force had been transmitted up the spine, producing a fracture of the base, and at the same time sufficient concussion to account for death, and that it was then the acid was spilled. The jury acquitted the prisoner.

Scudder states that 85 per cent. of fractures of the base begin in the vault and travel to the base. Here the direction of force as given for the defence seems to me to be correct. In my experience the fracture as described is very unusual: and the small extravasation would not be sufficient to account for death.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Enlargement of the Prostate. By John B. Deaver, M.D., Surgeon-in-Chief to the German Hospital, Philadelphia; assisted by Astley Paston Cooper Ashhurst, M.D. London: Rebman Ltd.

Dr. Deaver has already attained distinction as an author; his "Surgical Anatomy" is a monumental work, and his treatise on appendicitis is generally regarded as affording the best exposition of this difficult subject in the English language. The present work, while not ranking in importance with either of the preceding, is an able representation of the subject of enlargement of the prostate, and is modelled on the lines customary in monographs on special subjects. The history of the disease, its anatomy, pathology, clinical features, diagnosis, prognosis, and treatment are dealt with systematically. While the results of the author's experience are included, he has taken pains not to remain uninformed of the opinions of other surgeons. The controversial aspects of the subject are considered with admirable impartiality, and the claims of partisans, which have not always been advanced in good taste, are generously dealt with. In illustration we may quote a paragraph on page 13: "Whether or not every shred of prostatic substance is removed by Freyer's operation is of very little consequence; who first performed such an operation is of less; and whether it is anatomically possible or not, is of no consequence at all; since the results in Mr. Freyer's cases speak for themselves, and he has aroused the profession, not only in his own country, but in France and America as well, to the realisation of what a brilliant chapter of prostatic surgery is unrolled in his achievements. Indeed, were I inclined to criticise the reports of Mr. Freyer's cases in any way, it would be to say that they are almost too good to be believed, except when coming from such a source, so much like a fairy story do they read."

The author supports the conclusion that the prostate is physiologically a part of the genital and not of the urinary apparatus.

The organ is described as being enclosed more or less concentrically first in its own capsule, then within its venous plexus at the sides and anteriorly, and by the bladder above; and finally, outside of the venous plexus again, passes the sheath derived from the pelvic fascia.

The author pleads for a collective investigation of large groups of cases reported in such detail that a general view may be had of the type of enlargement, its duration, the clinical history of the case as well as a microscopical study of the diseased organ removed by operation or at autopsy, as being the only means of arriving at definite conclusions regarding the etiology and pathology of the condition.

He holds very strongly that the glandular and fibrous types do not succeed one another, but that they are entirely distinct in their evolution, clinical history, and treatment. A marked enlargement of the median lobe is regarded as exceptional, and the number of specimens collected in museums as misleading, because of the passion of surgeons for preserving the curious.

We agree with him in declining to accept the statements of Albarran and Hallé as to the frequency of carcinomatous degeneration.

The explanation given of the occurrence of impaired micturition in the apparent absence of mechanical obstruction, assumes the existence of a hard œdema or fibrosis in the neck of the bladder and prostate whereby the vesical outlet becomes rigid, the prostatic urethra cannot open up into continuity with the bladder at the onset of micturition; in other words, the obstruction results from the immobility of the parts.

We would not question the author's orthodoxy in bacteriological questions, but we might suggest that he is unfortunate in such expressions as "the residual urine almost invariably becomes alkaline, and is a prolific cause of cystitis" (page 86), and that "infection is very liable to occur in a bladder which is already inflamed" (page 81).

The author's views on the use of the cystoscope in the average case of enlarged prostate are seasonable, and should be taken to heart by the young and enthusiastic specialist.

Of Bottini's operation, it is well said that its results are so uncertain, both as to immediate relief of symptoms and as to permanency, that the author advises against it except in a very limited group of cases. Castration is described as an absolutely indefensible operation. The important subject of prostatectomy is discussed in all its bearings. The author, in common with many others, has had excellent results from removing the ball-valve alone in middle lobe cases. The suprapubic operation is regarded as being preferable to the perineal in the majority of cases, in spite of greater liability to be attended with shock, and to be followed by pulmonary complications, a preference which is not shared by the majority of American surgeons, who have adopted the perineal as the routine operation. The author is honest enough to confess—what is denied by certain partisans—that there are prostates which can be enucleated neither by one route nor the other.

We have read Dr. Deaver's book with interest and profit, and we can confidently recommend it as an authoritative treatise on the subject.

A Handbook of Intestinal Surgery. By Leonard A. Bidwell, F.R.C.S.
London: Baillière, Tindal, & Cox.

This clearly written and well illustrated little handbook embodies the teaching of a class in intestinal surgery conducted by the author at the West London Post-Graduate College. The details of suture as applied to stomach and intestine are gone into very thoroughly. The Murphy button receives but little attention, and its use in lateral anastomosis is not even mentioned ; as a matter of fact, cases are met with in which the button affords the only means of establishing the anastomosis desired.

A Text-book of Medical Chemistry and Toxicology. By JAMES W. HOLLAND, A.M., M.D. Philadelphia and London: W. B. Saunders & Co.

WE have been most favourably impressed by a perusal of this book. While making no pretensions to be a text-book on pure chemistry, the author has contrived to write a volume from which the medical student, even if he had read no other introduction to chemistry, would be able to get a remarkably sound and clear knowledge of what he ought to be acquainted with in this respect.

Professor Holland rightly considers that before the practical applications of chemical science to medicine can be properly discussed, the ground must first be laid by the elucidation of physical and chemical philosophy. This task he successfully accomplishes. He commences with a short consideration of those subjects in physics which are intimately associated with chemical problems, such as metrology, heat, magnetism, electricity, and light. In dealing with these, the opportunity is taken to explain the essential facts in cryoscopy, spectroscopy, polerimetry, and the use of other instruments required in clinical investigations. The major portion of the volume, dealing with the chemistry of inorganic and organic elements and compounds, is also excellent, and contains exactly what every student should know and will find useful in practice.

In connection with each substance, its toxicology is considered, and we congratulate the author more especially on the manner in which he has fulfilled this part of his task.

With due regard to the popular importance of each poison, he discusses the symptoms, fatal dose, treatment, methods of detection, and tests, etc., and we find the information thus given to be both accurate and up to date. Interpolated amongst the pages devoted to the consideration of the metals, there is a short chapter on water supply. The *raison d'être* of this it is not easy to understand. The subject of water supply is one for a text-book on public health, and cannot be adequately or justly considered in a volume such as the one under review. The little knowledge which the author imparts under this heading may prove dangerous if put into practice, instead of advantageous, and we should strongly advise the student to read a manual of public health as a corrective to some of the views expressed or implied. The final pages are devoted to physiological and clinical chemistry, and deal with digestion, blood, milk, and urine fully and with clearness.

A Handbook for Midwives and Maternity Nurses. By COMYNS BERKLEY, M.B. London: Cassell & Co.

THIS is a compact and well-arranged volume, specially written for nurses going up for the examination of the Central Midwives' Board. The usual subjects are dealt with clearly, shortly, and succinctly. Only such treatment is mentioned as can be carried out by a nurse previous to the arrival of the physician in charge of the case. A sketch of the lines of treatment likely to be adopted by the physician would enable the nurse to have a more intelligent appreciation of the principles underlying the preliminary treatment she is expected to carry out.

There is an excellent chapter on "House Sanitation,"—a subject too frequently omitted in such works. But in the special chapter, and throughout the whole volume, the subject of asepsis and antisepsis seems to be not sufficiently reiterated, and not sufficiently emphasised.

The abundance of good illustrations and the clear arrangement of the matter are two good features, well calculated to make this book amply fulfil its purpose.

The National Standard Dispensatory. By Hobart Amory Hare, B.Sc., M.D., Charles Caspari, Jun., Ph.G., Phar.D., and Henry H. Rusby, M.D. London: J. & A. Churchill.

This work is intended to succeed the well-known Dispensatory of Stillé and Maisch, which has been used as a standard book of reference by medical men and chemists for many years. The work of revision has been divided among several authorities. Professor Rusby, of the College of Pharmacy in New York, is responsible for the sections on pharmacognosy, while Professor Caspari, of the Maryland College of Pharmacy, Baltimore, deals with pharmacy, and Dr. Hare writes the sections on the medical action and uses of the various substances. In addition to these authors, special sections have been devoted to experts. The result is an elaborate and comprehensive volume, containing the natural history, chemistry, pharmacy actions and uses of almost all substances used as medicines. It contains not only all the substances incorporated in the Pharmacopœia of the United States, but also those official in the British and German Pharmacopœias. Of even more value is the fact that the vast territory of unofficial drugs and preparations is also covered, and in this way an enormous amount of out-of-the-way information is made readily available. The greatest care has been taken to make the nomenclature as full as possible, and the authors claim that nearly all common names for drugs have been given. Due weight has been given to drugs which have only a local reputation. The descriptions have been written with a view to the practical identification of the drugs, and are in many cases illustrated by woodcuts representing the drugs as they actually occur in commerce. The pharmaceutical sections are specially written for the druggist, but they include fresh information regarding methods and apparatus. There is a valuable article on the volatile oils by Dr. Kremers, of Wisconsin University. The sections dealing with the pharmacognosy and pharmacy of the various drugs are distinctly more valuable than those allotted to the descriptions of the uses and actions of the drugs. The latter seems to have been written in a somewhat perfunctory fashion, and is not by any means so elaborate or detailed as the other portions. In the appendix there is an interesting account of the method of physiological testing, in which

Dr. E. M. Houghton, the pharmacologist to Parke, Davis & Co., describes the method employed for estimating the activity of certain drugs by means of experiments on animals. The enormous range of subjects covered in this book may be appreciated to some extent, when it is mentioned that the general index runs to over one hundred pages. In addition there is a special therapeutic index. As a book of reference on pharmacy and pharmacognosy this work is certain to prove useful.

A Text-book of Materia Medica for Students of Medicine. By C. R. Marshall, M.D., Professor of Materia Medica and Therapeutics in the University of Dundee. London: J. & A. Churchill.

This book is intended to serve as a guide to the British Pharmacopœia, and as an introduction to the study of pharmacology and therapeutics. It is somewhat out of the run of ordinary books on Materia Medica. In so far as the first of these objects is concerned, Professor Marshall has been very successful, and has given us an excellent and accurate commentary on the British Pharmacopœia. The chemistry and composition of the drugs are carefully described, and are very accurately given. The individual preparations are separately described, and any point of special interest for the medical man is noted. A large number of illustrations have been reproduced, but these are not strikingly successful, and probably the book would not have suffered if they had been curtailed, and the extra space so gained devoted to amplifying the sections on pharmacology. In describing the pharmacology of the various substances, Dr. Marshall has, as a rule, followed the plan of describing only the effects produced by therapeutic doses on man, together with any toxic action or effects which may follow prolonged use. This plan saves space, as it avoids tedious descriptions of animal experiments, but at the same time the utter absence of any padding makes the resulting descriptions rather condensed and difficult to memorise. The therapeutic uses are very briefly indicated. The book is, on the whole, remarkably accurate. The chemical and pharmaceutical sections are particularly good. Any inaccuracies which we have noted were contained in the pharmacology sections, and none of them were important. It is, however, hardly correct to say that squill is a more powerful diuretic than digitalis, while aloes rarely produces watery stools, even in large doses. Gelatin, when used to hasten the coagulation in an aneurysm, is not injected directly into the aneurysm, but into the subcutaneous tissue.

Diets and Dietetics. By A. Gautier. Translated by A. J. Rice-Oxley, M.A., M.D. London: Archibald Constable & Co

This text-book of dietetics deals with the subject at considerable length and from very varied points of view. It perhaps rather falls between two stools—it is too long for the purposes of the student, and not long enough to be a work of reference; but even if that be so, the book is one which contains a vast amount of information about this important subject, and can be read with profit by all medical men. The book consists of three parts: the first deals with the general principles of dietetics and methods of study, the second with the composition of food stuffs, and the third with diets in health and disease. Among the specially good portions of the book, that in which the author describes his study of the food supply of Paris may be singled out. It is interesting reading, and it is remarkable how closely the conclusions of that study agree with those of dietary studies based on very different material. The author's handling of the difficult subject of the differences of absorbability of food stuffs, and the effect of those differences on their dietetic values, is also specially good. Similar praise, however, cannot be paid to those chapters dealing with institution dietaries, nor can approval be expressed of the author's somewhat loose and unscientific conclusions regarding the effects of animal and vegetable foods, for he argues that the former tend to make man ferocious and wild, while the latter tends to physical repose and mental clearness. The translation has been done only fairly well, the book in English does not read smoothly, and the reader in several places has some difficulty in following the arguments.

Genito-Urinary Surgery and Venereal Diseases. By J. W. White, M.D., and Edward Martin, M.D. Sixth Edition. Philadelphia and London: J. B. Lippincott Company.

In the eight years since the first edition of this book appeared, it has established itself as one of the standard text-books on the subject. We may mention a few criticisms which occur to one in reading the volume. The specific microbic origin of chancroid is regarded as still unproved, Ducrey's bacillus not being accepted by the authors as such. Cock's operation for retention of urine from stricture is mentioned but not described, and the same applies to Peters's method of transplanting the ureters into the rectum in exstrophy of the bladder; both are worthy of being given in more detail. In enlargement of the prostate the use of the various intra-urethral instruments for diagnostic purposes seems to be rather lightly undertaken, in view of the risk of introducing infection. Removal per urethram of pedunculated vesical tumours can be more accurately accomplished by means of the combined cystoscope and écraseur than by a lithotrite. The description of nephrectomy is confused, and there is an error in connection with the freezing-point of urine. These, however, are small points taken at random, for the book is written carefully and with full attention to detail. The descriptions of the anatomy and physiology of the various parts of the genito-urinary apparatus are useful without being too long. The diagrams and photographs are good, but the coloured illustrations of syphilitic eruptions and cystoscopic fields in the bladder serve, by comparison with the uncoloured, to show how difficult it is to convey a proper idea of such things by uncoloured drawings; the plate of urinary calculi, however, has rather too many rainbow colours. This is one of the few books published outside Scotland which recommend the Sprengel pump principle for bladder drainage; it is described here as Dawbarn's method, though Cathcart's name is mentioned. There is a long chapter on urinary symptomatology, and a full description of the examination of the urine, and of other methods of urinary diagnosis, such as cystoscopy, segregation of the urine, catheterisation of the ureters, and the various other means of testing renal capability. As regards prostatectomy for enlarged prostrate, the balance is held evenly between the perineal and suprapubic routes, some cases being suitable for each method.

A large amount of space is naturally devoted to venereal diseases, syphilis claiming more than one-fifth of the whole volume. In the preface the authors state that symptomatology, diagnosis, and treatment are the primary objects of the book, not pathological questions, especially where not definitely settled. This has excluded any discussion regarding the cause of syphilis, and the *Spirocheta pallida*, though depicted in a coloured frontispiece, is not mentioned in the text. Syphilitic skin eruptions are very fully described and illustrated. Constitutional treatment of the disease in a typical case may be summarised as follows:—No mercury till the diagnosis is established; then mercury continuously for two years, six weeks of mouth administration alternating with a fortnight of inunction; then mercury and iodides for the next six months, and iodides alone for any tertiary manifestations. Excision or cauterisation of the primary lesion, if seen before lymphatic involvement, is regarded as a justifiable and in a number of cases a successful abortive measure.

The book can be thoroughly recommended, but reference would be simplified if more separate headings were included in the index.

Supplementary Essays on the Cause and Prevention of Dental Caries. By J. Sim Wallace, M.D., D.Sc., L.D.S. London: Baillière, Tindall, & Cox.

Dr. Sim Wallace has constituted himself the champion of the hypothesis that dental caries is caused by the consumption of "pappy" food, and may be prevented by the substitution in childhood of articles of a "fibrous" consistency. The hypothesis is based on large assumptions, and a liberal amount of circular argument has been expended in its support. By like assumptions and arguments the cause of dental caries may as convincingly be found in Vaccination, Compulsory Education, or Free Trade. It appears there are still, strange to say, some doctors and dentists unconverted to the author's views. He therefore returns to the charge with these supplementary essays on the cause and prevention of dental caries. Dr. Wallace's mental attitude to what he calls pap food is only comparable to that of the schoolboy who wrote in his "Essay on Pins": "Pins has saved many lives by people not swallowing them." He does not strengthen his case by constant reiteration of his argument or by the tone he adopts to other authorities, to whom he is unjustifiably patronising or contemptuous. His little book requires revision. *Corpus Ville* (p. 2) is not Latin; neither is it a printer's error, for it occurs again on p. 79. "Over six years have elapsed since my investigations . . . was published," is not a grammatical sentence. The following paragraph, with its conditional invocation of Divine aid, is quite superfluously vulgar:—"So again I must regretfully admit that in America the great dictum that the 'toothbrush is mightier than the dentist' still reigns supreme. If the dictum be correct, God help the dentist!"

Nobody has ever attempted to "catch the *fata morgana*" (p. 59). Perhaps the *ignis fatuus* is meant. The author says (p. 78): "If in recent years medical men have been able to inflict a restricted, soft, alkaline, insipid, unphysiological, and even repulsive diet on the vast majority of children, is it not possible that they will in the future be able (with the aid and advice of the dentist) to impose a less restricted, less pappy, less insipid, and in general a less disagreeable diet on future generations? It may be remembered that at one time the lancet was the panacea for all diseases. . . . Possibly the pap craze will go the way of the lancet."

This invites the comment that to depreciate others is not the best way to glorify oneself.

The Maladies Common to Animals and Man. Edited by P. Brouardel and A. Gilbert. With twenty-six illustrations. Paris: Librarie J. B. Ballière et Fils.

This volume is one of a series being published, and, as the title implies, deals with the diseases common to man and animals. The feature of the publication is that the best known authorities of France have contributed their views on each of the several diseases under review. Tuberculosis, as may be imagined, bulks largely, and is ably dealt with by Ernest Hosny and Leon Barnard. These two authorities go into the subject in a most thorough manner, the bacteriology being specially interesting and well put. Koch's views are discussed, and as these do not quite coincide with French teaching, much interesting reading results. It is not often one comes across scrofula as a separately described affection nowadays, but a special section is devoted to this exhibition of the tuberculosis taint. The author, Paul Gallois, prefers to associate scrofula with chronic glandular enlargements, and as such the malady is described. Other diseases dealt with are morve, actinomycosis, charbon, psittacose, rage, tetanus, ladrerie, trichinosis, and ankylostomosis. Each disease is treated in a thorough and learned manner. First comes its definition, followed in turn by etymology, history, pathological anatomy, experimental pathology, bacteriology, differential diagnosis, therapeutics, etc. Little has been left undone, and one welcomes such a readable and reliable work upon a subject which has been studied far more thoroughly on the Continent than it has been in this country. The bibliography is very complete, and the many references quoted will render the production an extremely valuable work of reference.

Preservatives in Food and Food Examination. By John C. Thresh, M.D., and Arthur E. Porter, M.D. London: J. & A. Churchill. 1906.

During recent years the extraordinary increase in the consumption of preserved foods of various kinds, and the large number of preservatives which have come to be employed, have directed attention to the effects upon health which the use of such foods are likely to cause.

In 1899 the President of the Local Government Board appointed a Departmental Committee to inquire and report upon the use of such preservatives, partly to allay the natural uneasiness of the general public, and partly also to satisfy the desire of importers and preparers to secure a definite pronouncement as to the alleged dangers.

The inquiry showed that practically every one except breast-fed infants daily consumes food which has been chemically preserved, but no conclusive evidence was afforded that, apart from certain exceptional cases, the consumption of chemically preserved foods and drinks was the cause of actual harm.

Indeed, it would appear that the supposed dangers have been greatly exaggerated, although it must be admitted that certain preservatives may exercise a deleterious effect either from the quantity and quality of the drug used, or by a cumulative action producing detrimental changes upon the organism.

Upon this latter point and the effects of prolonged administration, there is not as yet sufficient evidence to permit of definite opinions being expressed.

The present volume is an attempt to deal with the whole question of foods in relation to the public aspects of the use of preservatives, and of unsoundness of food produced in other ways.

So far as we are aware, there is no book in the English language covering the same ground so completely, and the authors must be congratulated upon supplying a much felt want in so comprehensive a manner.

The opening chapters deal with the pharmacological and physiological actions of the various preservatives, after which milk, beverages, jams, meat, game, and other varieties of foods are considered as regards the preservatives and colouring matters found in them. Special chapters are devoted to meat rendered unsound by putrefactive changes, from disease in the animal or by bacterial infection, and the subject of so-called ptomaine poisoning receives adequate consideration.

Not the least important part of the work is the portion devoted to the methods of detection and estimation of the various preservatives, which will be found well up to date, and a useful and accurate guide for those engaged in practical work. In conclusion, a valuable résumé of legal cases is given, as also appendices containing abstracts of the Report of the Departmental Committee, and in regard to the law and practice of certain foreign countries on the subject of food preservatives.

The book will be found indispensable by the medical officer of health and by all who are interested in a question which is of great national importance.

NOTES ON BOOKS.

An interesting monograph on *The Treatment of Gonorrhœa in the Male* comes from the pen of C. Leedham-Green, M.B., F.R.C.S. (Baillière, Tindall, & Cox, London, 1906), embodying the most recent views on the disease and the results of his own experience. Special attention is drawn to the great frequency of posterior urethritis, chronic urethritis, and chronic prostatitis, and to the value in diagnosis of the "two-glass" or "three-glass" urine test, and of the use of the endoscope. In most cases, the author from the outset combines local injections with the ordinary constitutional treatment. There are three classes of fluids —those which are antiseptic, antiseptic and astringent, and simply astringent. The first are employed in the acute stage, the second when the discharge becomes thinner, and the third at the end of treatment. Under chronic urethritis are described the methods of irrigation, massage of the prostate, application of strong solutions through the urethroscope, and urethral dilatation. The various complications of gonorrhœa are discussed briefly, and the proof of the cure of the disease with special reference to marriage. This is an excellent little book, giving the practical points of diagnosis and treatment with the scientific foundations on which they are based.

The fourth edition of *First Aid to the Injured and Sick*, by F. J. Warwick, B.A., M.B., M.R.C.S., and A. C. Tunstall, M.D., F.R.C.S.Ed. (John Wright & Co., Bristol, 1906), is in every respect a capital advanced ambulance handbook. The initial chapters give the essential points of the anatomy and physiology of the human body, and are followed by others dealing with bandaging, and the usual emergencies, such as hæmorrhage, wounds, fractures, asphyxia, poisons, and states of unconsciousness. Methods of removing the injured by hand stretcher or waggon are also described. The various conditions are fully dealt with, the descriptions are clearly expressed, and the book in consequence is easily read. There are over two hundred illustrations, which show all that is required. The price of the book—one shilling—is another point in its favour.

Aids to Surgical Diagnosis, by H. W. Carson, F.R.C.S. (Baillière, Tindall, & Cox, London, 1906), is a book of pocket size. The methods of examination employed in the various regions of the body, and the signs, symptoms, and differential diagnosis of some of the important conditions, are rapidly gone over. As the title indicates, treatment is not discussed. The book is euphemistically described as "for the use of students and practitioners who may desire to obtain in a small compass the main points in the diagnosis and differential diagnosis of the more common surgical diseases." In other words, it is a "cram" book, but differs from many of that class in being generally very accurate, and in giving a good idea of most of the conditions to which reference is made.

The ninth edition of *The Frog: an Introduction to Anatomy, Histology, and Embryology*, by the late A. Milnes Marshall, M.D., D.Sc., M.A., F.R.S. (David Nutt, London, 1906), is edited by F. W. Gamble, D.Sc. Since the first edition appeared in 1882, this elementary text-book has been widely used in zoology classes, and is known to most men who have graduated within the last fifteen or twenty years. There have been no marked changes required in the present edition, but some figures have been added, and the chapter on development has been revised.

Mr. Wm. Thorburn has published, in the form of a small handbook, the notes of a *Course of Instruction in Operative Surgery* (University Press, Manchester), which he has hitherto been in the habit of providing in typewritten form to the members of his class. This he has done "partly for the convenience of our own students, and partly in the hope that they may be of some use to others." Of the advantage to the author's own students of having this carefully arranged syllabus of the course there can be no question, but we doubt if it will prove useful beyond the school from which it emanates. To say this is in no way to disparage Mr. Thorburn's book. As a working guide it is excellent, but as no two teachers of a practical subject such as operative surgery follow the same plan, such a book can have only a local value and interest.

This small work of 243 pages—*Essentials of Bacteriology*, by M. V. Ball and Karl M. Vogel (London: Henry Kimpton)—has been brought well up to date, and the information it presents is concise, and for the most part accurate and reliable. We confess to surprise at finding the statement that only a very few persons have succeeded in discovering tubercle bacilli in milk; and, again, that anthrax "seems confined to certain districts in Siberia, Bavaria, and Auvergne." A number of strange terms are employed in the text, such as "nurture ground," "culture ground," "brood oven," "brood-heat," and "Klatsch preparation." There are ninety-six illustrations, some in colour, and six plates, mostly copied from standard works.

The appearance of so many editions of this little work—*Essentials of Gynæcology*, by Edwin B. Cragin (London: Henry Kimpton)—proves that it is well adapted to the requirements of the student. The value of the text, which is arranged in the form of questions and answers, is materially enhanced by a number of useful illustrations.

This work of 240 pages—*Clinical Bacteriology and Hæmatology*, by W. D'Este Emery (London: H. K. Lewis)—can be confidently recommended to the practitioner. It furnishes a simple guide to the methods of bacteriological examination and diagnosis, the methods of blood examination, cyto-diagnosis of pleural, cerebro-spinal, and other fluids, the mode of estimating the opsonic index, and the technique of cutting and staining sections for microscopic examination. The methods of examination which are described will be found both serviceable and reliable, and we know of no book dealing with clinical bacteriology and hæmatology which is better adapted to the requirements of the practitioner. The illustrations are excellent.

Dr. Paul has succeeded in producing a most excellent handbook of fever nursing—*Nursing in the Acute Infectious Fevers*, by George P. Paul (W. B. Saunders & Company). He writes simply and clearly, and never above the heads of the audience to whom he addresses himself. He devotes the first part of his work to the general symptoms and treatment of fever, and mentions also the special conditions which may complicate it, and the appropriate methods of dealing with them. He then takes up in detail all the infectious diseases, and there are few chapters in which useful hints on their management and nursing will not be found. While some sections are better than others, all give an adequate account of the disease under discussion, though we would have liked to see stress laid on the importance of the recumbent position in diphtheria. A detailed account of the nurse's duty in preparing a patient for intubation is given, and, for this country at least, a similar note on the requisites for a tracheotomy would have added value to the chapter. A large number of very good temperature charts illustrate the book, and plates are also included, showing the commoner bacteria, a short account of which is given in the concluding section. Notes are also added on the subject of antitoxins, poisons, and the early symptoms of poisoning. We think the handbook is a good one.

Dr. Paton—*New Serum Therapy*, by D. Montgomerie Paton (London: Baillière, Tindall, & Cox)—has for some years employed diphtheria antitoxin in various conditions of sepsis. His method is to give the serum in one-drachm doses by the mouth. The results which he has obtained by this method encouraged him to experiment with the use of simple blood plasma of the ox and sheep in various conditions of anæmia and malnutrition. He claims that the result on the general nutrition of the patient and on his resistance to disease are quite out of proportion to the mere food value of the plasma, and that therefore the success of the treatment must be due to certain elements in the plasma, probably of glandular origin, which are readily absorbed, and produce their own physiological action. He maintains that the elements in the blood plasma of the ox, which make it especially resistant to influenza, and those in the horse and sheep, which make them resistant to tubercle, can be absorbed, apparently unchanged, in the human stomach, and exercise their peculiar function in man.

It is impossible in the limits of a brief notice to follow all the arguments of Dr. Paton. Suffice it to say that his book contains detailed records of cases of almost all known diseases, and of the effect of his method of treatment in each. Such different conditions as dysmenorrhœa, the result of a retroflexion, and cerebral meningitis are reported to have improved under a treatment of drachm doses of antidiphtheritic serum by the mouth. The chapter on the treatment of diphtheria is interesting, for in it Dr. Paton makes it quite clear that it is not the antitoxic quality of the antidiphtheritic serum which he utilises when he prescribes the serum orally, but the elements above mentioned which the serum contains. For antitoxic effect he administers the serum hypodermically, but after one or two injections he takes up the oral administration of the remedy, which he regards as especially efficacious against the superadded septic infection so frequently met with in diphtheria cases. Dr. Paton has also performed experiments on dogs, and has found that after injection with diphtheria toxin the oral administration of doses of antitoxin is capable of preserving life, but the doses have to be very large. The book is certainly an interesting one, and is very suggestive, but we doubt whether the methods of treatment advocated by Dr. Paton will be generally adopted. One can hardly help regarding with suspicion a remedy so universal in its effects.

The medical profession should be grateful to Dr. White for providing it with such an excellent résumé of what is known about common colds (*Catarrhal Fevers, commonly called Colds*, by R. Prosser White. London: H. K. Lewis). We have always felt that far too little attention has been paid to this most important subject, and that the dangers of colds are not fully realised. Dr. White discusses the subject very fully, and gives many references which will be found most useful by those desirous of making a full study of the question. His own work has been largely confirmatory of Cautley's, whose bacillus coryzæ segmentosus he has found almost invariably in cases examined within three days of the onset of the catarrhal symptoms. The bacteriology of the subject is very difficult, however, owing to the organism being of a diphtheroid nature. It is necessary, therefore, to distinguish it both from the diphtheria bacillus and from the bacillus of Hoffmann. Presumably, also, it would now have to be distinguished from the diphtheroid organism described as occurring in general paralysis by Ford Robertson and M'Rae. As regards treatment and prevention, Dr. White gives very sound advice, and is a great believer in the virtues of fresh air. Altogether he has produced a most readable and interesting little book, which we recommend to the notice of all practitioners of medicine.

Considerable embarrassment is often experienced in obtaining the exact sense of an anatomical expression in a language different to our own. This small volume—*Nomenclature Anatomique en quatre langues*, par le Dr. Paul Rodet (Masson, Paris)—gives the corresponding anatomical terms employed amongst the Teutonic, Anglo-Saxon, and Latin races, and will be found to be of the greatest help and convenience to those who are not thoroughly conversant with foreign languages.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF
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Muco-membranous Colitis and Appendicitis.

A discussion on this subject, lasting through six sessions of the Paris Academy of Medicine, was initiated by Professor Dieulafoy with a paper on "The Erroneous Diagnosis of Muco-membranous or Gravelly Entero-colitis as Appendicitis, resulting in the ablation of the healthy appendix" (*Bull. Acad. de méd.*, Paris, 1906, May 29, June 5, 12, 19, 26, and July 3). Dieulafoy, who proclaims himself an ardent partisan of operation as the sole efficacious treatment of appendicitis, is none the less deeply concerned by the number of persons condemned to laparotomy through errors of diagnosis. He gives in some detail twelve personal observations of patients suffering from membranous colitis in which a wrong diagnosis of appendicitis led to appendicectomy. By way of example, one of these may be quoted: A young girl had suffered for two years from muco-membranous typhlo-colitis, in the course of which, painful crises, accompanied by diarrhœa and the passage of false membranes, occurred at intervals. Latterly the pain had been localised chiefly in the right iliac fossa, and this led to the diagnosis of appendicitis. Operation was proposed, but when Dieulafoy examined the patient, he found that while the cæcal region was acutely painful, there was also tenderness along the whole ascending and transverse colon. Relying on his experience that in such cases the pain was cæcal, not appendicular, in origin, he refused to sanction an operation. One was, however, performed, and a quite healthy appendix was removed. Such diagnostic mistakes may be summed up thus: In some persons affected with mucous colitis, typhlitis predominates; when this is the case, the pain is greatest in the right iliac fossa. Then, from its being supposed that appendicitis is a frequent sequel of mucous colitis, the typhlitis is overlooked, and a non-existent appendicitis is operated on. Such surgical errors have multiplied incredibly of late years, especially since it has become customary to make a post-operative diagnosis of appendicitis from histological appearances alone. What commonly takes place (we paraphrase Dieulafoy's own words) is, "You are called to a patient with acute abdominal pain; he knows both that he has a crisis of mucous colitis, and that it is devoid of danger. You palpate the abdomen methodically, and discover a point of maximum tenderness in the appendix region, and, if imbued with the current notion that appendicitis is a frequent sequel of colitis, you fall into the trap, say that a surgeon must be called in, and have the appendix removed. The organ is found healthy. Now intervenes the microscopist; a new variety of appendicitis—histological appendicitis—emerges, and saves the situation." Numerous descriptions of such minute changes as fibrosis, follicular hypertrophy, and hæmorrhagic folliculitis have been published, and these have been assumed to justify a diagnosis of appendicitis, but, as a matter of fact, similar changes may be found in any random series of appendices removed post-mortem. The follicular hæmorrhages found so constantly are simply the result of operative trauma. Appendicectomy has no effect on the symptoms of mucous colitis; of this Dieulafoy is assured from having followed up many cases. These diagnostic and operative errors are unknown to the public, which merely wonders why appendicitis has become so common. Moreover, the idea that he has, or is in danger of a recurrence of, appendicitis, exercises a bad effect on a patient with colitis—he is apt to become hypochondriacal, fastidious as to his food, constipated, and emaciated. The remedy for this unfortunate state of affairs is to attend to the symptoms of the two affections. In mucous colitis remember (what seems to be forgotten) that there exists both a cæcum and typhlitis. Second, get rid of the notion that appendicitis is common as a sequel to colitis; the combination of the two is excessively rare. If it should occur, the diagnosis ought to present no great difficulty.

The prolonged discussion which Dieulafoy's communication initiated centred mainly round three issues—(1) The value of histological findings as signs of appendicitis in organs apparently normal on naked eye examination; (2) the alleged antagonism between mucous colitis and appendicitis; (3) the question whether mucous colitis predisposed to appendicitis, or *vice versâ*, and if so, the effect of appendicectomy on colitis.

Cornil took up the cudgels for histological appendicitis. He strongly insists that an appendix, apparently quite normal to the naked eye, may show grave lesions microscopically, such as leucocytic and microbic infiltration right up to the serous coat, transformation of the mucosa to cicatricial tissue, partial or complete occlusion, or minute abscesses.

Reclus also thought that Dieulafoy holds histological appendicitis in too great disdain. In cases of clinically genuine appendicitis, which the latter would avowedly have operated upon instanter, nothing but microscopic lesions may be present. The crucial point in the question, however, is the relation of appendicitis to muco-membranous colitis. It will be generally conceded that any form of enteritis is liable to invade the appendix. Colitis is most pronounced wherever there is any stagnation of the contents of the bowel, as at the cæcum and flexures of the colon, and it is inconceivable that it should respect the appendix,—a cloaca in which every species of the pathogenic flora of the bowel flourishes. Clinical observations, too, support this *a priori* probability; in his own experience Reclus has met with fourteen cases of well-defined mucous colitis complicated by appendicitis; in one of these Dieulafoy denied that the appendix was affected, yet operation proved it to be diseased. Of course, a surgeon does not promise a patient that by removing the appendix he will cure the colitis; all he does is to remove a perpetual danger. At the same time, in many cases the original disease is benefited by appendicectomy. The only point on which Reclus agrees with Dieulafoy is the difficulty which sometimes attends the diagnosis of chronic appendicitis. In attacking as erroneous the diagnosis of appendicitis in cases of colitis, the path is opened for the much greater danger of delay until too late.

Richelot agrees that the number of healthy appendices removed has increased enormously in recent years, and thinks that Dieulafoy does good service in bringing the matter up. Dieulafoy fails, however, to prove conclusively that there is no relation between mucous colitis and appendicitis. Richelot's view is that—(1) Some forms of intestinal disorder arise from appendix mischief, and (2) appendicitis always arises from intestinal disease. Mucous colitis is often, if not always, due to reflex nervous disturbance, the original focus of mischief being a distant organ—tube, ovary, and sometimes appendix; he has seen many cases of relief to the symptoms of mucous colitis after removal of the appendix. Conversely, appendicitis is invariably a disease of intestinal origin. The appendix is not an organ apart; it is not a defensive structure, like the tonsil; it is a vestige, which from its form is an admirable nidus for the growth of the flora of the bowel. Appendicitis has no special etiology; the configuration of the organ, the stagnation in it of the intestinal contents, particularly if the bowel be unhealthy, are amply sufficient to account for its becoming inflamed. It is quite arbitrary to say, as Dieulafoy does, that mucous colitis and appendicitis are antagonistic. Even in so-called instances of appendicitis being due to a general disease (*e.g.* influenza or rheumatism), Richelot believes that the disease arises directly from disease of the intestine.

Le Dentu believes that, so far from there being any antagonism between the two diseases, appendicitis, particularly the chronic or subacute form, is not infrequently associated with the onset of mucous colitis. It is not always easy, however, to say which of the two diseases is primary. Sometimes there is a long previous history of colitis; in other cases, after recovery from an attack of appendicitis the patient becomes dyspeptic, constipated, and finally subject to typical crises of membranous colitis. In such cases he has seen removal of the diseased appendix cure the colitis, while again he has operated on appendicitis with abscess formation without in any way affecting the course of the colitis. He suspects that some of Dieulafoy's patients who asserted that they had been operated on through error come under this head. They might be unsuccessful results *quâ* the colitis, but all the same the removal of the appendix was more than justified. Le Dentu is also convinced that an apparently perfectly healthy appendix may show dangerous microscopic lesions, and he strongly opposes Dieulafoy's sceptical remarks on histological appendicitis. More than that, he thinks he can often foretell that in a given case the appendix will appear normal after removal. If the case is kept at complete rest for six weeks or so after a mild attack, until all signs of inflammation have subsided, the gross lesions will be almost nil; leave such an appendix alone, however, and a fresh acute attack may supervene at any moment. Admitting, for argument's sake, that appendicitis and mucous typhlocolitis may coexist, the diagnosis, it must be conceded, is often extremely difficult. This, however, is chiefly in subacute or chronic forms of appendicitis, which do not necessitate prompt operation; the very acute cases have, in addition to the local signs, the general reaction—fever, vomiting, leucocytosis, etc.—as a guide. In chronic cases he is inclined to diagnose appendicitis when the localisation of the pain is well defined, when the exacerbations always retain the same character, and when they are not inevitably followed by the passage of typical muco-membranous or gravelly stools. Not all these cases require operation; in many the appendicitis is transitory, but if the pain persists the stricture should be removed. Considering how ineffectual the medical treatment of mucous colitis has proved itself, Le Dentu thinks that surgeons may be excused for having tried the effect of removing the appendix.

Reynier agreed with Dieulafoy in his opposition to too frequent operation for appendicitis. He also thoroughly coincides with him in saying that tenderness over McBurney's point does not always by a long way point to inflammation of the appendix. He quite dissents from the view that mucous colitis and appendicitis are mutually exclusive. On the contrary, many cases of the former disease arise from the appendix, just as they may from uterine or tubal disease, or stricture of the gut. This is proved by the undeniable fact that sometimes mucous colitis is cured by removal of the appendix. In reproaching surgeons for removing healthy appendices, it should be remembered, first, that the stump of the organ was left behind, while the distal and therefore sometimes healthy part was excised; and, second, that after having been acutely inflamed, the vermiform, like any other organ, may undergo cure. For these two reasons it is common to find an apparently healthy appendix in quite legitimate interval operations.

In reply to his critics, Dieulafoy does not deny that a diseased appendix may show nothing except microscopic lesions; at the same time he adheres to his statement that many histological changes, which have been regarded as evidence of appendicitis in the clinical sense, may be met with in any series of appendices removed post-mortem from patients dying of other diseases. As to the relation of appendicitis to mucous colitis, surgeons, he says, have no adequate chance of deciding the question. It is true that individuals may suffer from both diseases (the wonder is that the coincidence is so rare), but hundreds of cases of colitis, under medical supervision throughout almost their whole lives, never have appendicitis, and there is no evidence that the combination of the two is more than an accident,—mucous colitis does not cause appendicitis, any more than appendicitis causes mucous colitis. In further support of his position, he cites a fresh case of a man whose appendix was removed for a crisis of colitis, the organ subsequently proving entirely free from even those common pathological changes on which undue stress has been laid. Dieulafoy concluded by presenting to the Academy a long communication from Professor Duret, Lille, in which the conclusion arrived at is: There are three groups of cases—(1) Muco-membranous colitis, or typhlo-colitis, in the evolution of which the cæcal appendix plays a considerable part, but which recover spontaneously. In them appendicectomy has no effect on the malady. Clinically, these are recognisable as typical entero-colitis, with pain and tenderness in the cæcal region, not definitely circumscribed. (2) Typhlo-colitis, in the course of which appendicitis develops. (3) Primary appendicitis, usually non-suppurative, which is gradually followed by the development of muco-membranous colitis. In the second and third groups operation is indicated.

SURGERY.

UNDER THE CHARGE OF

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Stiff and Painful Shoulder.

This common and troublesome condition is discussed by E. A. Codman of Boston in a practical and suggestive paper (*Boston Med. and S. Journ.*, 1906, May 31). Every out-patient clinique furnishes its quota of patients who come complaining of pain and stiffness in the shoulder, with inability to put the arm behind the neck, or behind the small of the back. The condition is usually attributed to "rheumatism," "fibrous ankylosis," "paralysis of the deltoid," "peri-arthritis," etc.; but Codman believes that in the majority of cases it is really due to involvement of the subdeltoid bursa. With the aid of some admirably clear diagrams, this bursa, which has received but scant attention from the anatomist, is described. The author prefers the term subdeltoid to subacromial, and he does not agree with those who describe two separate bursæ by these terms. It is one bursa, which is sometimes bilocular. This bursa is indispensable in abduction and rotation of the humerus. Were it not present in abduction of the arm, the great tuberosity would carry the deltoid in under the acromion and pinch it. It is equally important in rotation of the humerus. Any communication between the subdeltoid bursa and the synovial cavity of the joint the author considers pathological, and he thinks it seldom exists.

From its position the bursa is specially liable to injury or pressure, and it is liable to be implicated by—(1) *trauma*, *e.g.*, a fall on the shoulder, sudden muscular effort, pressure, or over-use; (2) from prolonged *fixation* of the joint, as after injuries; (3) in *infective conditions*, such as acute rheumatism, gonorrhœa, suppuration, or tubercle. After injury, the bursa may become distended with fluid, followed by the deposit on its walls of fibrous lymph, which causes the contiguous surfaces to become adherent. As the movement in the direction of abduction and rotation causes pain, the muscles about the joint become fixed from involuntary reflex spasm, the patient refrains from making the painful movements, and the joint becomes stiff. Similarly, when any infective process is present, the exudate becomes organised, and movement is impaired and painful.

Clinically, the author recognises four types of the condition. Type 1 includes acute or recent cases, in which the joint is locked by reflex spasm. There is, however, always some motion between the scapula and the humerus both in abduction and rotation; there is never complete ankylosis. In other words, the humerus can be moved to some extent (about 10°) without calling into play the inflamed portions of the surfaces of the bursa. Local tenderness may be elicited over the anatomical limits of the bursa, and is usually most marked over the great tuberosity just external to the bicipital groove—the point which forms the most prominent part of the shoulder. Pain is a constant symptom, and is especially annoying at night, the patient being unable to get into a comfortable position. The pain is usually referred along the distribution of the external or internal cutaneous nerve to the region of the external condyle,—probably, the author thinks, owing to involvement of the musculo-cutaneous nerve in its passage through the coraco-brachialis muscle. Sometimes the maximum pain is referred to the insertion of the deltoid. Demonstrable effusion is not uncommon, but is disguised by the overlying tissues. If left to himself, the patient tends to maintain the limb in the "sling position."

For this type Codman recommends a line of treatment calculated to relieve the pain in the first instance, and to prevent adhesion of the inflamed surfaces. A splint, designed by Monks, holds the arm at right angles to the body in internal rotation and abduction; or the patient may sit beside a table with his arm resting on a pillow in this attitude. As soon as the pain will permit of it, movement of the arm is carried out. Above all, the patient should not be allowed to maintain the arm in the sling position. Counter-irritants are not recommended.

Type 2 includes the "chronic adherent cases," and is the most common. There is usually slight pain, but the chief complaint is of limitation of movement, and the muscles about the shoulder are atrophied. The condition is often mistaken for neuritis, and in some cases the secondary changes in the nerves and muscles simulate lesions of the brachial plexus, or progressive muscular atrophy.

In the milder cases the treatment consists in passive movement, hot-air baths, and counter-irritation, and in the more severe ones the adhesions are broken down under ether. To prevent the patient carrying the arm in the sling position, the limb is fixed in the attitude of abduction and external rotation. In this connection the author emphasises an observation he has made, and which he believes to be original, that "complete abduction (elevation) of the humerus necessitates external rotation." As a rule, it is only necessary to keep the arm on the splint for one week; and for the next week it is worn for about an hour a day. In a few cases the author has opened into the bursa and broken down the adhesions directly, but he does not recommend this method for general use.

The essential characteristic of Type 3 is pain on certain movements, although ability to carry out the full arc of motion of the joint persists. The pain is usually felt at that point of abduction at which the tip of the tuberosity passes under the acromion. Treatment is carried out on the same lines as in Type 2.

Type 4 includes severe traumatic cases, in which rupture of the supra-spinatus tendon takes place, or the portion of bone to which it is attached is torn off. It sometimes complicates subcoracoid dislocation. Adhesions form, and are treated in the same way as cases of the second type.

In the diagnosis it is important to distinguish between affections of the shoulder joint itself and those of the subdeltoid bursa. In pure subdeltoid bursitis there is always some degree of painless abduction, flexion and extension, and internal rotation; but when the shoulder is involved, the spasmodic fixation is nearly absolute. When the shoulder joint is affected, as a rule the bursa is also, but the reverse is not true. Most minor traumatic lesions involve the bursa, and a few the true joint. Although often overlooked, subdeltoid bursitis is one of the most common conditions in the region of the shoulder.

Surgical Treatment of Subclavian Aneurysm.

Savariaud (*Rev. de chir.*, Paris, 1906, July) has brought the literature of this subject up to date by reviewing what has been written during the last twenty years. His conclusions, therefore, indicate the results under the Listerian régime. In considering the subject, it is necessary to divide subclavian aneurysms into two groups: those which are entirely external to the scalenus, and those which are both external and internal to this muscle.

Those outside the scalenus are essentially surgical, and are amenable to treatment by extirpation or by ligature. Of twenty-two cases of this class included in the present survey, there were only two deaths. When the aneurysm extends to both sides of the scalenus, the results are less favourable. Of twenty-nine cases, there were eight deaths and three recurrences. Those cases which were treated by proximal ligature (first part of the subclavian, innominate, etc.) show a very high mortality, while those in which the ligature was applied on the distal side yielded results, both immediate and remote, which were more satisfactory.

Gastric Fistula.

According to the observations of Patel and Leriche (*Rev. de chir.*, Paris, 1906, July), fistula between the stomach and the cutaneous surface, resulting from ulceration of the stomach, is comparatively rare. It may ensue as a result of a focus of perigastritis suppurating and bursting on the surface or being opened by incision. Such an abscess may point and burst without having given rise to any symptoms by which it could be recognised clinically. Under these conditions the fistula is usually situated in the high part of the stomach, doubtless because this part is less movable and therefore more liable to form adhesions with the parietes.

When formed, the characters of the fistula vary with their site. In those near the cardiac end of the stomach the escape of gastric contents is intermittent, and the general health of the patient does not deteriorate rapidly; in those near the pylorus, it is continuous, with a corresponding effect on the patient's nutrition.

Fistulæ situated in the high part of the stomach may be treated by medical measures in the first instance, and the opening frequently closes. If this fails to take place, operative treatment may be had recourse to. In fistulæ near the pylorus, the abnormal track should be excised, and the opening in the stomach sutured.

Malignant Disease of the Thyroid Gland.

This subject has been exhaustively studied by Müller and Speese (*Univ. Penn. Med. Bull.*, Phila., 1906, June), and their conclusions, briefly stated are as follows:—Malignant disease of the thyroid is not a common affection. It is met with most frequently in women between the ages of 40 and 60. Only 11 per cent. of the cases of sarcoma occurred in patients under the age of 30. In 53 per cent. of cases a history of previous goitre was obtained, and this in over half the cases was of more than ten years' duration. Adeno-carcinoma, and the round- and spindle-celled sarcomata, are the most frequent types of tumour. Papillary cyst-adenoma-carcinoma is the least malignant form of carcinoma, and presents the most favourable prognosis. The metastasis involves the lungs and bones most commonly, and of the latter the skull and inferior maxilla the most frequently. Carcinoma invades distant structures by way of the blood vessels, and sarcoma may be disseminated through the lymphatic channels with greater frequency than is the usual rule. Malignant goitre is the cause of death in at least 70 per cent. of cases.

OBSTETRICS AND GYNÆCOLOGY.

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The Prevention of Catheter Cystitis.

Gersum (*Centralbl. f. Gynäk.*, Leipzig, 1906, No. 4) states that traumatic injury of the vesical mucosa is frequently a cause of cystitis. To avoid this, he has devised a catheter shaped like an S, with a disc-formed stop in the middle. Each end is of the same shape, and 5 cms. long. The catheter is made of thick glass, and the ends well rounded off. There is no lateral opening. Gersum has used the instrument in thirty-five cases, some of them repeatedly, and in only one case cystitis occurred.

Post-Operative Tetanus.

Martin (*Centralbl. f. Gynäk.*, Leipzig, 1906, No. 11) reports a case five days after vaginal fixation and colporrhaphy in a patient, æt. 37, which proved rapidly fatal in spite of antitoxin serum. Inoculation experiments on a mouse produced an attack of tetanus. Martin believes that the bacillus had been present in the vagina, and that the suture employed had been thus infected.

Tetanus after Abortion.

Seegert (*Centralbl. f. Gynäk.*, Leipzig, 1906, No. 14) reports a case of trismus and tetanus after abortion at the third month, fatal on the third day, in spite of frequent injections of antitoxin. Seegert believes that in addition to the antitoxin, such a case might with advantage be treated by vaginal hysterectomy of the puerperal uterus.

Results of Vaginal Extirpation of the Uterus for Carcinoma.

Blan (*Beitr. z. Geburtsh. u. Gynæk.*, Leipzig, Bd. x. Heft 3) reports 309 radical vaginal operations performed from 1890 to 1903. The operability of all cases amounted to 18·5 per cent., the primary mortality was 5·8 per cent., permanent cures 30·4 per cent., and the proportion of cures to cases seen was 5·6 per cent. In 113 cases the uterus was extirpated with Paquelin's cautery, and in forty-seven of those Schuchard's incision was employed. Whether the vaginal or abdominal route gives the best permanent results is still uncertain.

The Action of X-Rays on Inoperable Cancer.

Schwecking (*Centralbl. f. Gynäk.*, Leipzig, 1906, No. 9) treated a case of inoperable uterine cancer in a woman, æt. 56, for five weeks, with the result that there was destruction of the entire surface of the growth to the depth of several centimetres, arrest of the putrid discharge, and the formation of healthy granulation tissue which afterwards cicatrised.

Intra-uterine and Abdominal Pregnancy.

Pinos (*München. med. Wchnschr.*, 1906, No. 16) reports the following case:—Patient, two months after a normal labour, noticed that the abdomen remained distended. Abdominal section showed the case to be one of ectopic pregnancy, a macerated fœtus being removed. The placenta lay behind at the right side, on the membrane that covered the intestine. It was not removed, but allowed to come away spontaneously, which it did in the course of a month.

Tuberculosis of the Pregnant Uterus and Placenta.

Jung (*Monatschr. f. Geburtsh. Gynäk.*, Berlin, Bd. xxiii.) reports a case of tuberculosis of tubes and caseous infiltration of the decidua. On examination of the placenta, there was found extension of the disease into the fœtal portion. Jung thinks that in this case the child must have been infected with tubercle while still in the uterus. The uterine tuberculosis was probably caused by descending extension of the tubal disease.

Post-mortem Cæsarean Section.

Nacke (*Centralbl. f. Gynäk.*, Leipzig, No. 10) reports the case of a woman who died from mitral stenosis and pulmonary œdema at the ninth month of pregnancy. Cæsarean section was immediately performed, and a living child extracted, which, however, died in an hour and a half. Nacke believes that in this case the child's death was due to hæmorrhage into the liver, the result of Schultze's method of artificial respiration.

Disappearance of the Liquor Amnii.

Ahlfeld (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. lvii.) describes seven cases in which very little liquor amnii was discharged during labour. The result was very peculiar changes in the skin of the fœtus. In most of the cases the mothers were primiparæ, and the children were deformed, the latter Ahlfeld thinks the result of the want of liquor amnii.

THERAPEUTICS.

UNDER THE CHARGE OF
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The Treatment of Tetanus by Intraspinal Injection of Magnesium Sulphate.

In an article on the inhibitory and anæsthetic properties of magnesium salts, Meltzer pointed out that the injection of a 25 per cent. solution of magnesium sulphate into the spinal canal controls the muscular spasms of tetanus. The proportion of the solution required is 1 c.c. for each 25 lbs. of body weight. He treated a case on these principles with success. The theory is that by removing the exhausting influence of the muscular spasms, the patient is put into a more favourable condition for overcoming the morbid process. Two other cases of tetanus treated on the same plan have been recorded by Logan. In the first case, the treatment was partially successful, though the patient eventually died. The amount injected corresponded to 1 c.c. for each 20 lbs. of weight. To facilitate the injection, the patient was anæsthetised, but despite this, owing to the incomplete relaxation of the muscles, some slight difficulty was experienced in making the intraspinal injection. There was complete muscular relaxation forty minutes after the injection. Even the rigidity of the abdomen and jaws disappeared, though this had not been effected under the anæsthetic. The patient was perfectly conscious. About four hours after the injection the respiration became disturbed, there was profuse bronchorrhœa, and the breathing grew shallow and rapid. These symptoms cleared up under the injection of $\frac{1}{150}$ gr. of atropin. sulph. The patient remained quiet and free from spasm during twelve hours. He was able to talk and swallow fluids. The first return of spasm was noted twelve and three-quarter hours after the injection. All the symptoms returned in undiminished severity, and a second injection was given twenty-three hours after the first. This caused relaxation of spasm in thirty-five minutes, but, as with the former injection, respiratory weakness with bronchorrhœa developed three hours after the injection. The pulse after each injection remained fast and feeble. An attempt to administer a nutrient enema brought on a severe convulsion, but with this exception no further spasm supervened till death occurred seventeen hours after the second injection. The heart failed before the respiration. The second case was tetanus of a fulminating character supervening seventeen days after vaccination. The symptoms were very severe. Thirty hours after the onset of the symptoms, magnesium sulphate was injected in the proportion of 1 c.c. for each 25 lbs. of body weight, but was followed by no relief, except perhaps some lengthening of the period between the convulsive attacks. A second injection was made seventeen and a half hours after the first, with equally little benefit, and the patient died from respiratory failure. In the first case the treatment effectually controlled the convulsions, and the author explains the failure in the other case by insufficiency of dose. The muscular relaxation induced was very complete, so that four hours afterwards it was impossible to bring on a spasm by handling or pinching the patient. The period of relaxation, thirteen hours, was longer than could have been obtained by any other method of treatment. The only annoying feature of the treatment is the development of late respiratory disturbance. Possibly it is due to the spreading up of the paralysing action of the magnesium sulphate to the medulla, and might be controlled to some extent by injecting the solution slowly and propping up the patient in a sitting position as soon as the muscular relaxation commences. These measures have proved useful in limiting the upward spread of other drugs injected into the spinal canal.—*Journ. Am. Med. Ass.*, Chicago, 1906, No. 20.

A similar use of magnesium sulphate has been recorded by Blake (*Semaine méd.*, Paris, 1906, No. 17). A youth developed tetanic symptoms six days after receiving an injury to his fingers. Repeated injections of anti-tetanic serum into the blood and spinal cord had no beneficial effect. On the sixth day of illness 4·5 c.c. of 1·25 per cent. solution of magnesium sulphate was injected into the spinal cord. In three hours there was distinct improvement, the opisthotonos disappeared, muscular spasms diminished, and the patient was able to move his limbs. The symptoms developed again after twenty-four hours, so a second injection was given in another nine hours. Subsequently two further injections were required, and three weeks after the first injection the patient was cured.

The Prophylactic Treatment of Syphilis.

Metchnikoff discusses the prophylactic treatment of syphilis. Hitherto serum treatment has not proved practicable, and in any case the immunity obtained in this fashion would only last for a few weeks at the very longest. By means of experiments on apes he is able to show that antiseptic lotions are also unreliable, probably owing to the fact that they do not readily penetrate into all the little fissures in the skin through which the virus gains an entrance into the tissues. For this reason antiseptic salves are much more reliable, and Metchnikoff has been able to prevent the development of syphilitic symptoms by treating the inoculated area with blue ointment. As superior to blue ointment, in that they cause no irritation of the skin, he recommends ointments made with calomel or white precipitate or a combination of salicylic acid, arsenious acid, and mercury. The best base to use is lanolin. In a series of eleven cases, in which these ointments were applied from one to eighteen hours after inoculation, he was able to prevent the development of syphilis. In each instance the control animal developed a hard chancre. That the antiseptic acts by destroying the virus is shown by the fact that no immunity was obtained to subsequent inoculations. The use of the ointment did not prevent the development of soft sores. Metchnikoff concluded that after a doubtful coitus, an ointment containing calomel or white precipitate should be rubbed on to the penis for four or five minutes.—*Med. Klin.*, Berlin, 1906, No. 15.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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A Method of Isolating the Pneumococcus in Mixed Cultures such as Throat Cultures.

The following solution is prepared. It is clarified by albumin and filtered through cotton. Peptone, 10 grs.; gelatin, 15 grs.; neutral bouillon, 800 c.c. A second solution is 15 grs. inuline dissolved in

200 c.c. water. Mix it with the first solution, and add to it 20 c.c. of a 5 per cent. solution of tournesol (Merck). Sterilise and place in tubes. Then add 1 c.c. of ascitic fluid to each tube, and sterilise. Inoculate by the throat swab, and if the pneumococcus be present it will grow as red colonies in about four days. This coloration is due to the fermentation of the inuline by the pneumococcus, which is the only germ of the mouth or throat which possesses this property. The method has one drawback, for the author met with one out of ten races of the diphtheria bacillus possessing the same fermentative property.—Gustav Ruediger (*Journ. Infect. Dis.*, Chicago, 1906, April 6, vol. iii.).

Bacteriological Findings in Fifteen Cases of Epidemic Cerebro-Spinal Meningitis.

Canby Robinson (*Bull. Ayer Clin. Lab. Penn. Hosp.*, Phila., 1906, June) isolated the organism from the spinal fluid, circulating blood, pus from the conjunctiva, and from the central nervous system, at autopsy in fifteen cases of epidemic cerebro-spinal meningitis, and found that in all cases it agrees with the *Diplococcus intracellularis* of Weichselbaum. It was isolated in pure culture from the spinal fluid of the fourteen cases in which lumbar puncture was performed, and is to be considered the causal agent in all the cases. This organism was obtained from the circulating blood in two of the four investigated cases, but in one only did it grow in the various culture media. It is probably only an occasional invader of the circulating blood, where it may be present for many days during the course of the disease. It may occur in the pus of purulent conjunctivitis, a complication not infrequently seen in meningitis. Secondary lung infections with pyogenic organisms are frequent, and a terminal broncho-pneumonia was found in five of the six cases that came to autopsy.

A Contradiction (?) to Colles's Law.

A. Buschke and W. Fischer (*Berl. klin. Wchnschr.*, 1906, March 26) record, in the course of a long paper, an interesting case. A woman, whose husband suffered from neglected syphilis, gave birth more than two years after marriage to a vigorous child, who exhibited a syphilitic papular rash. The mother, who nursed her child, had never remarked anything wrong with herself, except that lately her hair had become thin, but on examination a lymphatic gland as large as a pea was found in the groin. This was punctured, and the typical *Spirochæte pallida* was found in the material thus obtained. This showed that the mother of a syphilitic child, though apparently healthy herself, yet harboured the *Spirochæte pallida* in her glands.

Does the Blood of Syphilitic Patients contain the Spirochæte Pallida, and is it Contagious?

Nattan-Larrier and Bergeron (*Presse méd.*, Paris, 1906, January 10) continued their investigations by means of more perfect technique. To avoid error, they only recognised spirochætes which could be measured and their spirals counted, and did not take into account those lying near any precipitate, but only those completely isolated. They made their observations in three cases with well-marked secondary signs and untreated, both observers finding the spirochætes. In one case a spirillum showed two flagellæ, and another appeared bifurcated at one end, and in another case intracellular bodies lying alongside the free organisms were observed. It was necessary to examine a number of microscopic fields, as the spirochætes were very few in number. They conclude that the blood of secondary syphilides in untreated cases contains the *Spirochæte pallida*, and its examination is both of diagnostic and etiological significance. The difficulty attending the technique is a great drawback, and they hope that it will soon be greatly simplified. They cannot yet answer the question how long the spirochætes remain within the blood.

Hoffmann (*Deutsche med. Wchnschr.*, Leipzig, 1906, March 29) obtained blood from four syphilitic patients with all the necessary precautions, and inoculated it at once upon the scarified skin of monkeys. He was able to do this whilst the blood was still warm and not coagulated. Of four inoculations, two were positive and two negative. He concludes that the blood of syphilitics is contagious, though it holds little of the virus, that it contains it as early as the fortieth day after infection, and still holds it six months after, at any rate in persons who have not undergone anti-syphilitic treatment.

THE LYMPHATIC GLANDS AS A MEANS OF DIAGNOSIS IN HUMAN TRYPANOSOMIASIS (SLEEPING SICKNESS).

DUTTON and Todd (*Liverpool Sch. Trop. Med.*, Mem. xviii., 1906, March bring out the great importance of enlarged lymphatic glands, and an examination of the fluid obtained by their puncture in the diagnosis of human trypanosomiasis. They found that a diagnosis could thus be made in 97·2 per cent. of all cases, whereas an examination of the blood gave before centrifugalisation only 13·6 per cent., and after it only 54·2 per cent., and the cerebro-spinal fluid only 59·6 per cent. When the cases were divided into early (before any signs appeared) and late, the results were for the first 98·5 per cent. for the glands against 31·4 per cent. for the centrifugalised blood, and 13 per cent. for the cerebro-spinal fluid; and for the second 95·6 per cent. for the glands against 57·3 for the blood, and 96·6 for the cerebro-spinal fluid. These numbers justify the claim of the writers that puncture of the glands is the most effectual means of demonstrating the presence of the parasites in cases of trypanosomiasis. When the different groups of glands are compared, it is found that the post-cervical alone surpass 90 per cent., that the axillary only reach 87, the femoral 72, and the epitrochlear only 54 per cent. The cervical glands should therefore be chosen for examination when possible. The authors also investigated the proportion of infected individuals among those with enlarged glands, though apparently healthy otherwise, in an infected district. They found that it exceeded 70 per cent., and might reach 90 per cent. in certain classes of individuals.

They think that all negroes possessing enlarged glands without discoverable cause should be considered as affected with the trypanosomiasis even in districts where the disease is absent, unless proof to the contrary should be shown; and that, further, they should be prevented from entering uninfected districts, and should be put under treatment.

AN ATTEMPT TO OBTAIN AND ESTIMATE THE DOSAGE OF ANTI-MENINGOCOCCIC SERUM.

KOLLE and Wassermann (*Deutsche med. Wchnschr.*, Leipzig, 1906, April). The authors think that previous attempts to obtain a specific anti-meningococcic serum have failed because of the small size of the animals used for the experiments. They therefore used horses, and estimated the dosage *in vitro*. Three horses were immunised, one of them received cultures of the meningococcus grown for twenty-four hours on gelatin under the skin, the second into the veins, and the third an aqueous extract of living meningococcus obtained by shaking cultures for four or five days in distilled water. The doses of meningococcus injected were small, because sterile abscesses formed at the seat of inoculation and greatly hindered the progress of immunisation. Painful swellings appeared at the site of inoculation with the watery extract of the germs, necessitating the interruption of the injections for several weeks. For the estimation of the dosage the authors rejected the agglutinating, opsonic or bacteriotropic powers of the serum as unreliable, and selected the only procedure which they think is reliable and constant, namely, the deviation of the alexine (cytase). They recommend that the serum thus obtained by them should be injected subcutaneously in man in a dose of 10 c.c.

A THERMOSTABILE BACTERIAL POISON.

SCHWARZ (*Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, 1906, January 15, Origin 1, tome xl.) isolated from a guinea-pig with a peculiar lesion in the liver a motile bacillus resembling the colon bacillus. It was Gram negative, and showed a tendency to polar staining with the basic aniline dyes. After growing it in different media and filtering cultures through a Chamberland filter for nine to ten days, he obtained a liquid which killed a guinea-pig in a dose of 0·25 c.c. This toxin was not destroyed even when boiled for ten minutes. He thinks it is a variety of Gärtner's bacillus, distinguished by possessing a thermostabile poison.

PULMONARY COMPLICATIONS IN TYPHOID FEVER.

CANBY ROBINSON (*Bull. Ayer Clin. Lab. Penn. Hosp.*, Phila., 1906, June) considers that some observations recently made by him at the Pennsylvania Hospital throw some light upon the significance of the typhoid bacillus in pulmonary complications of typhoid fever. In the first case, the patient, after being in the hospital for twenty-seven days with a typical attack of typhoid fever, suddenly developed symptoms of lung infarction, after which he passed into a marked toxæmic condition, and died eight days later. At the autopsy, in addition to the typhoid ulcers, there was found a large abscess occupying the site of the infarct, and other broncho-pneumonic patches. A pure culture of the typhoid bacillus was obtained from the pus of the abscess. He quotes a somewhat similar case reported by Flexner and Harris, the only other one in which a lung abscess and gangrene followed typhoid fever, with bacteriological reports to be found in literature. He quotes Chantemasse and Widal, Finkler, Bruneau, Lepine, etc., in support of the production of broncho-pneumonia by the typhoid bacillus. In six autopsies upon typhoid fever cases at the Pennsylvania Hospital, in which cultures were taken from broncho-pneumonic areas, he found the typhoid bacillus only once. In the other five cases the common pyogenic cocci were isolated. He further studied cases of lobar pneumonia, complicating typhoid fever, and also the sputum of typhoid fever cases. He concludes—(1) The typhoid bacillus not infrequently invades the lung during typhoid fever. It may invade areas of the lung already the seat of hæmorrhagic infarction, and there produce abscess formation and gangrene. (2) The organism may cause broncho-pneumonia which has a great tendency to be hæmorrhagic. (3) Lobar pneumonia as a complication of typhoid fever is usually due to the pneumococcus. This organism may be present as a general infection in the circulating blood simultaneously with the typhoid bacillus. (4) It is probable that both *Bacillus typhosus* and *B. paratyphosus*, type B, can produce a massive pneumonia, lobar in type. When these organisms are the causative factors, the pneumonia is of a peculiar hæmorrhagic character, which may be recognised clinically from the bloody nature of the sputum. (5) The typhoid bacillus is not infrequently found in the sputum of typhoid fever patients with pulmonary complications. This fact should be emphasised in order that precautions should be taken to prevent infection through this source.

PHYSIOLOGY.

UNDER THE CHARGE OF

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THE NATURE OF THE HEART BEAT.

A LARGE number of important investigations has been published recently dealing with the nature of the contractions of smooth and cardiac muscle, and in some cases the writers have again supported the doctrine, which has not been in favour with the majority of modern writers, that the spontaneous contractility of these types of muscle is dependent upon the presence of nerve cells. v. Cyon, in a rather extravagant article, entitled "Myogenic Errors" (*Arch. f. d. ges. Physiol.*, Bonn, 1906, Bd. cxiii. S. 111), has attacked Engelmann and H. E. Hering, and has endeavoured to show how weak are their arguments in favour of the purely muscular origin of the automatic contractions of smooth and cardiac muscle. The paper consists mainly of a destructive criticism of the work of those who hold a different opinion from the writer. The work of Magnus is quoted with approval, as it shows that the automatic pendular movements of the intestine are not myogenic, but are due to nerve centres, such as Auerbach's plexus. The important work of Carlson (*Am. Journ. Physiol.*, Boston, vol. xii.), which showed so strikingly the important functions of the lateral and dorso-mesial ganglionated cords in connection with the rhythmical contractions of the heart of Limulus, is also referred to in words of high praise. As additional evidence of the influence exerted by the nervous system on the heart's action, v. Cyon refers to the effects produced by sudden mental disturbances upon the rhythm, a subject which is discussed fully in his work "Nerfs de Cœur." J. Dogiel and Archangelsky (*Arch. f. d. ges. Physiol.*, Bonn, 1906, Bd. cxiii. S. 1) have made a most useful contribution to our knowledge of the nervous control of the heart's action in different animals. It will be sufficient to merely summarise the more important conclusions arrived at by the authors: 1. The rhythmical cardiac beat is due to the co-ordinated action of a well-defined neuromuscular apparatus. 2. The source of the energy which initiates the beat is a discharge from nerve cells transmitted along nerve fibres to the muscle. 3. The cardiac terminations of the pulmonary veins and the superior and inferior venæ cavæ possess the power of spontaneous rhythmical contraction. This, according to the authors, is not due to any inherent property of the muscle fibres, but depends upon the presence of small groups of nerve cells in the walls of these vessels (in the frog). 4. In the same way the contractions of the sinus, auricles, ventricle, and bulbus arteriosus in the frog are dependent upon the nerve cells which are to be found in these parts. 5. The apex of the frog's ventricle only continues to contract spontaneously so long as it remains in physiological continuity (in respect to its nervous connections) with the rest of the ventricle. That is to say, so long as the apex, which contains no nerve cells (?), is connected with the nerve cells in the upper part of the ventricle by nerve fibres. 6. If the nerve cells at the auriculo-ventricular junction and the intra-ventricular ganglia be removed, the frog's ventricle loses the power of rhythmical contraction, although both muscle fibres and nerve fibres are still present. 7. The regular rhythm is also dependent upon the physiological continuity of intracardiac nerve fibre connections, as is shown by the marked alteration in the rhythm produced by section and stimulation of the nerve strands running in the interauricular septum. In this connection the authors carried out a series of very interesting experiments on the effects produced by section and stimulation of these fibres.

The investigators, after dealing with the cardiac control in the frog, then took up the subject of the course, distribution, and physiological function of the extra-cardiac nerves, accelerator and inhibitory, in a large number of different animals (mammals, birds, fishes, reptiles, and amphibians), and were much impressed by the great similarity in these respects shown by all classes. Some of their results may be shortly summarised:

1. Unilateral section of the vagus in the neck is followed by a slight increase in the frequency of the beat and after section of both nerves, artificial respiration being kept up, both an increased frequency in the number of beats and a rise in blood pressure are to be observed. These facts point to a continuous tonic influence exerted by the vagi on the heart, which is, of course, well recognised by all who have worked at the subject.

2. The inhibitory action of the vagus is shown not only on the rate of the beat, but also in a diminution in the strength of the contractions. Occasionally, however, there is an increase in strength of the beat, as may be observed in the frog, tortoise, and dog.

3. The inhibitory action of the vagi on the heart varies under different conditions, and, in fact, in some cases, is altogether absent. Some conditions which tend to increase the inhibitory action of the vagi may be quoted—(*a*) Simultaneous stimulation of vagus and depression in the rabbit; (*b*) section of spinal cord or bilateral section of the splanchnic nerves; (*c*) removal of the influence of the accelerator nerves.

Those conditions which effect a diminution in the vagal inhibitory action are the following: (*a*) Increase in blood pressure, whether this be due to stimulation of the cerebral vasomotor centre or to stimulation of the spinal cord, either by the electric current or by strychnine; (*b*) the combined action of the vagus and accelerator nerves. In the goose these are practically perfect antagonists.

4. The inhibitory action of the vagi is, in their opinion, most probably brought to bear upon the intracardiac nerve ganglia rather than upon the muscle.

5. The centre for the accelerator nerves is usually to be found in that section of the cord lying between the first and fourth dorsal vertebræ. Stimulation of the part, or of the anterior roots proceeding from it, results in an increase in the frequency of the beats without rise of blood pressure.

6. This increase is only to be observed when the path between the cord and the first thoracic sympthetic ganglion is uninterrupted.

7. Stimulation of the first thoracic ganglion after section of its connection with the cord, and also of the first and second branches of the Ansa Vieussenii, result in a 25 per cent. increase in the rate of the beat.

8. If, while the connection between first thoracic ganglion and cord is retained, the nerve fibres of the ansa connecting the former ganglion with the inferior cervical one be stimulated with the induction current, an increase in the pulse rate alone, or a rise in blood pressure alone, or a combination of these two, may result according as the following conditions are fulfilled: (*a*) If one or other of the branches constituting the Ansa Vieussenii be stimulated without previous section of either branch, an increase in rate of beat and a rise in blood pressure result; (*b*) after section of the branch above or below the artery, stimulation of the cut end on the cardiac side produces only an increase in the rate, while stimulation of the other end (*i.e.* towards the thoracic ganglion) results only in a rise in blood pressure. Stimulation of the upper branch of the ansa usually produces more marked effects than stimulation of the lower.

9. Stimulation of the long third branch from the thoracic ganglion to the heart produces both an increase in the rate of the beats and a rise in blood pressure if the nerve be uncut. After section, stimulation of the cut end on the cardiac side produces a marked increase in the rate, while stimulation of the other end results in a great rise in blood pressure.

10. After isolation of the cervical sympathetic from the vagus and stimulation of the isolated nerve, an increase in the frequency of the beat is usually produced, but not always.

All who are interested in the subject of the nervous control of the heart in different animals may be recommended to consult this paper, as there are many other interesting points brought out which it is impossible here to refer to.

DISEASES OF THE EYE.

UNDER THE CHARGE OF
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SPASM OF THE ARTERIES OF THE RETINA.

IN the *Ophth. Rev.*, London, for May last, Lundie published an interesting case, in which he saw with the ophthalmoscope a piece of one of the arteries actually undergoing spasmodic contraction.

A case of similar type and of much interest is published by Harbridge of Philadelphia. The patient was a younger man than that of Lundie, for he was only 49, and he gave an account of experiencing repeated attacks of complete loss of sight. These attacks were very brief in actual duration, lasting only from one minute to five, but were of very frequent recurrence, for on the day preceding his examination (the first day on which they began) they returned about once in every two hours, while on the following day the free interval was only about forty minutes. Sight appeared to leave the patient, according to his description, as if a fine veil, gradually becoming denser, were drawn across the field of sight, beginning at the nasal side; vision was thus completely lost for a brief period and began to return at the temporal side, the patient first observing phosphenes in that part of the field. Harbridge, at the first interview with the patient, had examined the fundus, and was proceeding to further investigation of the field of vision, when the patient stated that he felt an attack coming on, and the surgeon was thus able to observe the whole process in the fundus. Certain of the arteries became narrow and ribbon-like, first one and then another; then the corresponding veins followed suit, and the disc as a whole became rather pale, and a faint haze spread over the retina. After this had existed a minute or more, the arteries again began to refill, the veins next, and the haze cleared away. Vision, it is worthy of note, did not return till distinctly after the circulation had become re-established. Physicians failed to discover any material change in heart or kidneys to account for this peculiar condition, and his vessels could not be said to be sclerosed, at all events not more than to a very slight degree. From the fact that the patient ceased to be troubled with the symptom after pretty free purgation, Harbridge concluded that the spasmodic contraction of the vessel walls was caused by some toxin of intestinal origin. —*Ophthalmol.*, Milwaukee, U.S., 1906, July.

Unilateral Mydriasis in Phthisis.

In very few of the text-books on phthisis and pulmonary diseases generally will one find reference to the occurrence of one-sided dilatation of the pupil as an indication of lung mischief, but if what Bichelonne says is true, the condition ought surely to be frequently enough seen. In the particular case which led him to write on the subject, a young man of 20 was observed to have right-sided mydriasis, with some widening of the palpebral aperture on that side also. The mydriasis was of the "spasmodic type usually considered to depend on irritation of the sympathetic nerve." In the patient the only other pathological abnormality found was a patch of induration at the apex of the right lung: the alteration of the pupil may have been caused by this directly, or by indurated glands in connection with this patch. Cases of this kind have previously been published, chiefly, I think, by continental writers; for example, in a case published in 1890, Rampoldi, on post-mortem examination, showed that the unilateral mydriasis had been caused by adhesion of the inferior cervical ganglion to the thickened pleura: it was the seat of an intense leucocytic infiltration. Pernot examined a large series of cases, and, dividing the lung disease into three stages, finds unilateral mydriasis—on the affected or more affected side—in 5·8 per cent.; in the second stage, in 7·6; and in the third stage, in 14·2 per cent. Few, however, are likely to go so far as Destrée, who says he found inequality of the pupils in 97 per cent. of his cases of phthisis, but Bichelonne found ten examples in sixty-nine cases. The point is one for which careful watch should certainly be kept.—*Ann. d'ocul.*, Paris, 1905, October.

Non-Magnetic Steel.

At a recent meeting of the Ophthalmological Society, Snell, out of his unrivalled experience in Sheffield, brought forward a matter of considerable importance in connection with injuries to the eye. For the many industrial uses to which steel is put nowadays many different varieties of alloy are required. The effect of the incorporation with the steel of various substances has been found to cause very great variation also in the reaction of the resulting alloy to magnetic attraction. From the present point of view the important matter is the mixture of steel and manganese. Up till very recently, it was believed that if more than 2·75 per cent. of the alloy be manganese the metal becomes brittle and practically useless; it has now been discovered, however, that if a much greater amount of manganese is added, namely, from 7 up even to 20 per cent., to all intents and purposes a new and remarkably strong and tough material is produced, of great utility; but at any rate, when the percentage is above 12, this substance is quite non-magnetic. Other alloys are also manufactured, into the composition of which chromium, nickel, etc., enter, and these also vary in their magnetic qualities. In the event of a penetrating injury from any piece of steel, then, the question of the nature and composition of the flake or other missile may be an element of vast importance in the success of one's efforts to save an eye.—*Report of Ophthalmol. Soc. Meeting*, 1906, June.

AMAUROSIS CONSEQUENT UPON HÆMORRHAGE.

HÆMORRHAGE, even when extreme, very rarely produces blindness, but this misfortune does now and again take place, and there is still a little uncertainty about the precise cause. This uncertainty is partly accounted for by the fact that it may occur after a comparatively moderate loss of blood and not after an almost fatal hæmorrhage. Statisticians tell us that, though there must have been numerous instances of extreme bleeding in the Franco-Prussian war, no case of blindness was thus caused. It is plain that, in considering this matter, one must be on one's guard against regarding as an example of this occurrence any case in which the loss of vision and the blindness were both merely results of the same cause. Carlini gives notes of an instance of post-hæmorrhagic blindness which occurred in his practice, and discusses the etiology. The case was that of a healthy young workman who accidentally wounded his radial artery with an axe. For twenty minutes, before help could be obtained, he bled profusely, losing an immense amount of blood. By the time help could be got, he had shown three bad signs, for he had vomited, his pupils were dilated, and he had had convulsive attacks; these, we are told, are rarely present unless the loss of blood has been immense. So soon, however, as the bleeding was stopped he began to improve; but next morning, when first he recovered consciousness, he asserted that he was quite blind. The fundus—and this is a point of great importance in regard to causation—was then normal, and remained so all the time of his convalescence. By the fourth day, vision had so far returned that he was able to count fingers close to the globe. In the right eye at this time the lower field was completely lost and the outer part was decidedly restricted. Eventually vision rose to $\frac{5}{50}$, and the fields became to a considerable extent restored, but always showed defect to the lower left side; in fact, there was an imperfect left homonymous hemianopsia. In the various cases resembling this which have previously been recorded, the fundus has presented one of four different aspects: decided pallor of the disc either at once or later; œdema of the disc with hæmorrhages alongside the retinal vessels; a true papillo-retinitis; or there may be, as in this case,—but this is a much more rare condition of affairs,—no pathological alteration whatever from first to last. What is the method of causation of the amaurosis in such circumstances? Several theories have been propounded: in 1860, von Graefe suggested that just as hæmorrhages occurred in the retina so might one take place into the nerve sheath, pressing injuriously upon the conducting fibres, or even destroying them; in due course, atrophy must follow in such circumstances. To this theory it may be objected that, though it may no doubt account for some cases, it is without any real reasonable foundation, it has indeed never been verified, that in a number of the cases even the slender support afforded it by the presence of hæmorrhages in the fundus is entirely absent, and that it fails altogether in the cases in which the blindness appears more gradually after some weeks. Samelsohn propounded a more elaborate theory, which may be thus epitomised: During the hæmorrhage, fluid is withdrawn, of course, from the cranial cavity, and a vacuum would result were it not for the influx of cerebro-spinal fluid and lymph; later, when the blood is resupplied, it drives the lymph and other fluid into the nerve sheath, thus producing a condition of affairs closely analogous to that which causes choked disc. This theory, which is perhaps a little fanciful at any rate, fails for the cases in which no ophthalmoscopic changes are to be found from beginning to end, as with Carlini's present one. Some consider that no explanation beyond that of mere anæmia of the retina is required, some that this is accentuated by spasmodic contraction of the arterioles. Hirschberg thought that a previously existing endarteritis might thus be lighted up; however this might suit some cases, it could hardly apply to that of a healthy young artisan who cut his thumb. The explanation which seems to meet this case most satisfactorily is that of a cortical lesion caused by the watery œdema of the brain substance which must necessarily occur when the patient becomes so exsanguine. Two points in the record of this patient are at least in favour of this explanation, namely, that the condition of the fields suggested an imperfect hemianopsia, and that even at the worst the pupil reaction was conserved though vision was nil.—*La Clin. ocul.*, Palermo, 1906, February.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

Socialistic Legislation.

THERE can be no doubt that the present strong tendency towards legislation on a socialistic basis offers food for very grave speculation for all those individuals and corporative bodies which at the present time are enjoying privileges. It is not merely landlords and "randlords," trusts and syndicates, that are threatened with revolutionary change, but even those corporate bodies of the nature, say, of the universities, colleges, and royal and other academic institutions. Once let the attack on privilege assert itself boldly in individual directions, then the tendency will be to make the attack general. What may at one moment be a specific criticism is likely to evolve into a general onslaught. Admit the fact, and it is likely to be raised to a principle, and the principle being admitted and canvassed, it can hardly be said that any one is safe. The whole aspect of present-day legislation is to democratise government on the lines of granting to the number the former privileges of the few. Now privileges can be got rid of in many ways. The privileged body may be bought out, or its rights may be entirely confiscated. And there can be no doubt that the principle of pure confiscation meets with more and more approval every day. A study of the legislation as far as it has affected land impresses us with the truth of this fact. and one has only to look towards Ireland and South Africa to be made aware of how far this new principle may be carried. But we are not concerned here, directly at least, with the question on such political lines. It is for us to take warning as to what we may have to face in the future in our position as members of corporate bodies, academic or otherwise, which enjoy specific privileges. Is there not a danger, for instance, that the privileges enjoyed, say, by the Royal Colleges in their relation to the government of infirmaries, in relation even to the granting of degrees, may sooner or later be attacked? The lay reformer running riot in revolution will have little timidity in disputing the rights of privileged committees, and the most optimistic of us who may hope that matters may be allowed to persist in their present satisfactory state, cannot shut our eyes to the possible dangers ahead. We do not pretend to dispute that under the present system everything is for the best, but we will probably be called upon to dispute the fact that it is for the worst. And what we have said about confiscation must convince us that the argument that these privileges have been obtained not merely by Royal Charter but as an outcome of financial and other generosity on the part of the bodies concerned, will not save us from the attack of the reformer and revolutionist. We believe that the outcome of the present storm in the political and social camp will be to experiment in the nationalisation of privilege, to place it in the hands of the people, counted by the head. There are rights practised by such bodies as the Faculty of Advocates, the Royal Colleges of Physicians and Surgeons, and other allied bodies, the Royal Academy of Arts and their confederates in privilege, that are already earning the envy of less privileged bodies. In what manner the attack will be first made it is as difficult to see as it is idle to speculate, but that it will come sooner or later (and we think sooner than most imagine) is fairly certain. The fact that this is so is likely to affect seriously the desires of those who would wish, out of their private resources, to improve the endowment of these bodies. The fear of confiscation is no mere chimeron, no mere piece of academic or abstract pessimism. It is a social fact of outstanding importance, and is slowly affecting every inch of the ground on which our present ideas of stability rest. It is likely to affect the individual who possesses privilege first, then those bodies (trusts, charitable institutions, and the like) which hold large financial interests, and, finally, those bodies that hold rights and privileges not merely of a monetary nature. The likelihood is that the bodies concerned will follow the usual ostrich fashion of burying their heads in the sand, and shutting their eyes to the truth until it strikes them forcibly from behind. And it seems to us that there is no immediate way of facing the danger with any degree of surety as to the result. The individual can protect himself better than the corporate body. He can sell out or hold his hand as the case may be, but there is no market for the disposal of corporate privilege, apart from the generosity of the State, and that depends entirely on the view the majority take as to whether or not confiscation is easier than purchase. And there are certain privileges that have no marketable value even in the State. "The will of the people is the supreme law." That doctrine is coming more and more to be part of the decalogue of States, and the envy and ignorance of the many is likely to swamp the prescience and the sanity of the few. This is a question that should be seriously considered by all who believe in the value of privilege in the hands of the expert, and is a much more pressing question than those who believe in the doctrine of *laissez faire* care to imagine. After all, privilege can never be abolished, it can only be transferred, and we have to decide whether the privilege of one class (the few) is more dangerous than the privilege of another class (the many). It is not a question of classes and masses. The mass is as classic as the few, and much more impatient of contradiction. And to show that the fear we entertain is not mere idle dream, we would refer our readers to the literature of socialism, which frankly disputes the rights of corporate bodies to limit the freedom of the individual. The handwriting is on the wall, and whether the prophet is to be proved right or wrong will be seen, and seen very shortly.

The University Union. OF recent years a new factor has slowly but surely made an impression on university life in Edinburgh. This factor is the University Union, which, as we write, is rapidly approaching the completion of its latest additions; when this work reaches its culmination, it is no exaggeration to say that Edinburgh will possess a Students' Club which is unique in respect of extent and utility. We do not wish to enter here into its gastronomic capabilities, which led an untravelled Oxford undergraduate to term it an "eating-house,"—an expression which conveys an unintended compliment to the common sense of the Scot, who provides mental and physical pabulum together. Gissing has said that "your common Englishman has no geniality"; we wonder what his verdict would have been on the Scot reared in ungenial environment. The past generations would rise in their wrath, and mutter the names of hostels wherein the good ale flowed, if they were accused of lack of conviviality, but we have heard even members of that old brigade admit cheerfully the elevation of the spirit of camaraderie which may be traced to the enlarged acquaintanceship made possible by the Union's presence. Here is opportunity for that proper study which Pope asseverates is the true way in which to arrive at the motives and feelings of humankind; for its denizens are gathered together from the ends of the earth. Quite kaleidoscopic is the change of type passing unceasingly before one, coming and going in a few brief years. And the domestic life, if we may so call it, of the student changes: no longer is he content to return to his more or less gloomy chambers, but seeks in more social surroundings an outlet for that flow of soul which shut up in his breast becomes useless and of no account. In his intercourse with his fellow-students, he loses much of the angularity and the uncompromising dogmatism which otherwise he would carry on with him into the world; he becomes a more reasonable, more charitable, more lovable man; and with an increase of catholicity in his tastes, there arises a broader outlook upon the petty foibles and vain trivialities of mankind, which enables him to estimate these at their proper value, and to learn of the worth they may hide. The inclusion of students' clubs in his ideal scheme of tuition might well engage the attention of the author of "Mankind in the Making."

The New Harvard Medical School. BOSTON, in many respects the most interesting and attractive city in the United States, has this year been the scene of many celebrations. In the early part of June there was held the annual meeting of the American Medical Association, and, favoured by every condition and circumstance which might contribute to the success of such a gathering, a record was established of which any nation might well be proud. The attendance greatly exceeded that which obtains at similar meetings on this side of the Atlantic, and the members, many of whom had come from the most distant parts of their great country, were, perhaps in consequence, the more enthusiastic in taking advantage of their opportunities. Interest in the various functions was not confined to the members of the Association; the ladies—wives and friends of members—attended in large numbers, and followed with well-assumed interest the reading of papers, however abstruse or technical the subject in hand might be. A less admirable feature was the extent to which the members of the fair sex, other than doctors, invaded the hospitals and "assisted" at all sorts of operations.

Boston is undoubtedly an ideal city for a medical gathering, and those who were responsible for the arrangements achieved a veritable triumph, as everything, from the President's inaugural dinner to the final reception, went off without a hitch. It was characteristically American that the doctors had to leave the city as soon as the functions came to an end, to make room for the Christian Scientists, who, to the number of fifty thousand, descended on the place like an invading army, to take part in the dedication of the great temple of their "Science." It was the subject of amused comment amongst all classes, that when a number of "Scientists" were injured by the overturning of a motor-bus, it was to the General Massachusetts Hospital they were conveyed for treatment by the orthodox members of its staff, and not to their own temple or to any of their numerous prophets.

A most important celebration took place last month on the occasion of the opening of the New Buildings of the Harvard Medical School, to which delegates had been invited from every university throughout the world. The Harvard Medical School may be said to date from the year 1789, when John Warren, the younger brother of the hero of Bunker's Hill and the ancestor in a direct line of the present Professor of Surgery, was appointed Professor of Anatomy and Surgery to the Harvard Corporation. The lectures were originally delivered at Cambridge; but as most of the lecturers were engaged in practice, the Medical School was transferred to Boston in the year 1810. It is interesting to know that for twenty-five years the largest graduating class consisted of five members. In course of time the School was moved from one building to another to provide accommodation for the increasing number of students, until the ambition of the Medical Faculty to make Harvard the finest Medical School in the world resulted in the erection of the series of palatial edifices in Longwood Avenue. These are built entirely of white marble in the classic Grecian style, and form an architectural group which surpasses any buildings devoted to the teaching of medicine in any country. The visiting hospitals in Boston are situated in the centre of the town, and are quite independent of Harvard. It is expected, however, that new hospitals, with adequate clinical material and under the immediate control of the School, will soon be erected in its immediate vicinity, sufficient land having been acquired by the Faculty for this purpose and for the extension of the School in years to come. It is interesting to learn that for its present *clientèle* of 287 students there are thirty-four Professors, four Austin-teaching Fellows, and 108 Instructors, Lecturers, and Assistants. The internal arrangements of the new buildings are remarkable for the number of small-section teaching laboratories in place of laboratories intended to accommodate large classes. We were struck, in visiting Harvard, Chicago, Johns Hopkins, and other schools in America, with the development of practical work in the training of medical students and the teaching of clinical subjects in small classes. This American example is one which the older universities of this country might do well to emulate, for the rôle of systematic lectures to large classes as the chief means of medical education is sadly out of date.

The Toronto Meeting, 1906.

WHEN the British Medical Association accepted Canada's invitation to hold their annual meeting in Toronto, they acted with most commendable wisdom. The members of the Association who were fortunately able to cross the Atlantic owe a debt of gratitude to their brother practitioners in the Dominion for the splendid opportunity thus afforded to them of extending their travels and of visiting Canadian territory. It is frequently asserted—and we are forced to confess that there is much truth in the assertion—that Britons show a great want of knowledge regarding the affairs, the customs, and the people of the Colonies. In more than one of the speeches at the Association banquet this ignorance was referred to, and unfortunately we cannot deny the impeachment. We trust that the day is not far distant when this reproach will be removed.

The meeting was an unqualified success, and every member, visitor, and delegate is deeply indebted to Dr. Starr and his colleagues not only for their organising ability, but for their unfailing courtesy at all times. The University of Toronto is eminently suited for the accommodation of a large gathering, occupying as it does one of the most important sites in the city. Its handsome administrative block and numerous departments offer every facility for the housing of a medical conference. It was fortunate that this was so, as the meeting proved to be one of the most largely attended in the history of the Association. It had quite an imperial character. It was calculated that over three hundred members were present from the Old Country, and between five and six hundred visitors from the United States, while Canada herself and the various branches of the Association throughout the Empire brought the total attendance up to at least eighteen hundred.

It was gratifying to note the strong representation of the Edinburgh School, there being no fewer than twenty-one present from the Scottish Metropolis, while the number of familiar faces which were to be seen in the University grounds and Section rooms, recalling as they did memories of old classroom days, was further evidence of the representation of the School. To the Edinburgh graduate from this side one of the most pleasing features of his visit must be the memory of the kindly welcome and generous hospitality shown to him by the Canadian alumni of his Alma Mater, and many were the inquiries they made about their old teachers and their fellow-students in England and Scotland.

It must not be assumed that the meeting was merely a social one. On the contrary, the Sections were unusually well attended, and a new departure, at any rate so far as regards recent years, was made, in that four instead of three days were devoted to scientific work. We are inclined to recommend a repetition of this programme in future meetings of the Association. It was unfortunate, however, that Eastern Canada was visited by a heat-wave during the week of the meeting. It severely taxed the energies of all, and it reflects the greatest credit upon everyone that, in spite of the heat and accompanying humidity, the work of the Sections was carried on with so much enthusiasm. Of a truth "Our Lady of the Snows" had her revenge, because it was evident that, trying though the heat was even to our Canadian brethren, there was a half-expressed feeling of satisfaction on their part that the visitors from the Old Country must perforce take home with them a very different impression of the climate of the Dominion from that made upon them by Kipling's well-known verses. We can, however, assure our hosts that long after the impressions of the heat-wave have disappeared, there will remain the pleasantest memories of a most enjoyable holiday, and the pleasure of having visited a country which is destined to play an important part in the future history of the world.

Aberdeen University Quater-Centenary.

THERE seems to be a tradition that Aberdeen is a city in the Far North out of touch with the refining influences of modern civilisation, inhabited by a race, hardy from perpetual contact with a rigorous climate, and strenuous by having to wring a precarious sustenance from a reluctant soil. There is a widespread idea also that the grey skies never lose their leaden hue, that the city is perpetually overhung with a haze from the Northern Sea, and that the temperament of the natives has, through long centuries of endurance, become attuned to their surroundings, and is absolutely devoid of all those softer qualities which are supposed to be the prime possession of those reared under sunnier skies. Let us begin, then, by dispelling these time-worn fancies, which have nothing to recommend them but their hoary antiquity. We have neither time nor inclination at the present moment to vindicate our reputation in these respects, but those who wish more detailed information are advised to read the "Life at a Northern University," one of the Quater-Centenary publications, where will be found thrilling accounts of escapades and adventures which will remove all ideas of our phlegmatic character and lack of appreciation of the humorous side of things.

It is now some four hundred years since the foundation of the University by the distinguished cleric and statesman, Bishop Elphinstone. It was the fault of all his compeers in founding scholastic institutions in Great Britain, to neglect the scientific branches of knowledge for the purely abstract and linguistic. Elphinstone showed his width of view and far-seeing outlook in being the first to establish a constitution that included all the faculties from the beginning, and thus gave to Aberdeen the signal honour of having the first chair of Medicine not only in Scotland, but in Great Britain and Ireland. It is interesting to know that the occupant of the chair bore the title of "Mediciner," and had a "manse" allotted to him side by side with those of the Doctors or Teachers of Canon and Civil Law. Many changes have occurred since then, and chairs, including that of Medicine, have waned, lapsed, and revived again. Later on, the fierce struggle between Protestantism and Roman Catholicism led to the foundation of Marischal College, a separate degree-granting institution, giving to Aberdeen for a period of over two hundred and fifty years the unique distinction of possessing two separate and distinct universities granting degrees independently of one another. The heated rivalry between these two lasted over a couple of centuries, and seriously hampered the efficiency of both. However, after repeated efforts, time and again futile, their fusion was at last accomplished in 1860. Since then no Faculty has made such rapid advancement as that of Medicine. During the past sixteen years new departments have been built and equipped for Pathology, Anatomy, Chemistry, Botany, Natural Philosophy, Physiology, and Medicine, while considerable additions have been made to those of Surgery, Midwifery, Medical Jurisprudence, and Pharmacology. By a happy coincidence the Quater-Centenary of the University fell to be celebrated at the same time as the completion of the new buildings erected to meet the growing demands of advancing medical science. Great as the occasion would have been in the eyes of graduates in all parts of the world, greater interest was given to it by the gracious consent of His Majesty King Edward to perform the opening ceremony. Never before did Town and Gown combine with such hearty unanimity on a matter of University and Civic interest. Distinguished delegates from all parts of the world assembled in Aberdeen to add lustre to the ceremony, and arrangements were made on the most lavish scale to afford them a truly Highland welcome. The celebrations began on Tuesday, 25th September, with a Commemoration Service in the Chapel of King's College, part of the original buildings erected under the direct superintendence of Bishop Elphinstone. On the same day a procession of delegates, guests, graduates, and students, to the number of about three thousand, marched from Marischal College to the Strathcona Hall, which had been specially built to provide accommodation for the great banquet, at which the Chancellor of the University, with his accustomed generosity, entertained all connected with the celebrations. On Wednesday the Honorary Degrees of D.D. and LL.D. were conferred in the Mitchell Hall, Marischal College. In the afternoon a University Reception and Athletic Sports were held at King's College, while in the evening the students gave a Ball in the Music Hall. On Thursday the Opening Ceremony was performed by His Majesty the King, for which elaborate preparations had been made to accommodate some four thousand guests in the Quadrangle of Marischal College. The Aberdeen Medico-Chirurgical Society, which in the early years of last century had much to do with the development of the Medical School, arranged two dinners, at the first of which the chief guests were distinguished German physicians and surgeons, and at the other French medical men of note. Receptions, dinners, etc., given by the Town Council, Infirmary Directors and Medical Staff, and other bodies, not omitting the never-failing torchlight procession of the students, all figured in a programme which, it may be truly said, was worthy of so great an occasion.

There is every reason to believe that the post-graduate course which was inaugurated on 17th September, at a meeting presided over by Sir William Turner, has proved a great success. The number of graduates attending the course was considerably larger than was anticipated, and the attendance at the classes was excellent. Dr. Byrom Bramwell, who at the request of the executive committee made some remarks as to the scope of course, emphasised two important points with which we are in entire agreement. In the first place, he indicated the unique advantages which Edinburgh enjoys as a centre for post-graduate work,—a large hospital with abundant clinical material, a very large staff who have made a specialty of teaching, and in addition, and by no means of least importance, the proximity of the University, Royal Infirmary, and other hospitals, laboratories, and teaching institutions. Secondly, he emphasised the fact, which is not sufficiently known even in Edinburgh itself, that there are a number of post-graduate classes in continual progress throughout the year. That a short course, such as the present, cannot fail to be of the greatest value to the general practitioner, is certain. We should like, however, to see in the future, in addition to a short course similar to the present, a co-ordinated series of classes extending over a longer period of time, and adapted to meet the requirements of those who wish to work at any of the special branches of medical science.

ORIGINAL COMMUNICATIONS.

SOME POINTS IN THE SURGERY OF THE PERIPHERAL NERVES.[1]

By JAMES SHERREN, F.R.C.S. (Eng.), *Assistant Surgeon to the London Hospital, Surgeon to the Poplar Hospital for Accidents, Erasmus Wilson Lecturer, R.C.S. England.*

ALTHOUGH injuries of nerves are becoming less frequent in civil life, the surgery of the peripheral nervous system is increasing in importance. A wide field has been opened up for the treatment of paralysis and spasmodic affections by means of plastic operations upon nerves. I shall first discuss the means that are available to restore continuity to a divided nerve the ends of which cannot be brought into apposition, and then touch briefly upon the question of operations upon nerves for paralysis due to causes other than injury.

When exposing a nerve in order to perform secondary suture, it may fall to the lot of any surgeon to find that, in spite of nerve stretching and of flexion of the joint or joints over which the nerve passes, it is impossible to bring the ends into apposition. The problem which confronts him is how to fill in the gap which is left.

Many methods have been suggested from time to time, but they may be divided into five groups—

1. The transference of a portion of nerve from another source.
2. Flap operations.
3. The provision of a path along which the nerve may regenerate.
4. Utilisation of neighbouring nerves.
5. Shortening the limb by resection of bone.

Before proceeding to discuss these suggested methods of treatment, I wish to draw your attention to the unsatisfactory nature of the nomenclature at present in use. The operation of transplantation of a portion of nerve has been called in English-speaking countries "nerve grafting." Hearing this term, the average English medical man pictures to himself the insertion of a portion of nerve between the two ends of a divided nerve. But Létiévant,[2] when recommending and describing what has come to be known as "nerve anastomosis," the implantation of one nerve into another, called it "greffe nerveuse," and German surgeons speak of it as "nervenpfropfung." Thus, what is usually understood by us as nerve grafting conveys to the continental surgeon a different conception. If the term nerve grafting had been used consistently by English-speaking surgeons, this would not be of very great moment; but this has not been the case.

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[1] A lecture delivered at the Medical Graduates' College and Polyclinic, London.

[2] "Traité des sections nerveuses," Paris, 1873, p. 427.

To take two recent examples. Tubby,[1] in a valuable paper upon "Recent Surgical Methods in the Treatment of certain Forms of Paralysis," speaks of the operation of nerve anastomosis as "nerve grafting," and also as "nerve transplantation." Spiller, Frazier, and van Kaathoven [2] speak of it as "nerve grafting" or "nerve transplantation."

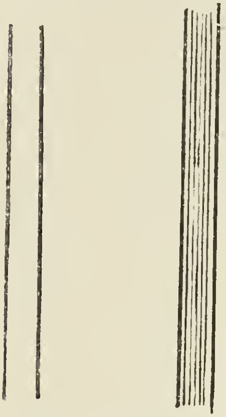

FIG. 1.—Showing sound nerve (unshaded), and affected nerve (shaded).

The name which seemed to me the most suitable for operations of this type was nerve implantation, but this does not cover a sufficiently wide field; for in many cases a flap is raised from the sound nerve, and end-to-end junction effected (*vide* Fig. 2 C). This could in no sense be called an implantation. The term nerve anastomosis seems therefore to be most suitable.

But under the name nerve anastomosis, as employed in this country and elsewhere, following Létiévant's example, two operations have come to be included—(1) In which the end of the injured nerve is brought into contact with *some* of the axis cylinders of the sound nerve,—this is the operation to which I would restrict the term nerve anastomosis; and (2) in which a neighbouring sound nerve is completely divided, and an end-to-end union effected. This should be termed nerve crossing. I consider that the term nerve grafting should be allowed to drop, and suggest the following nomenclature:—

Nerve transplantation.
Nerve anastomosis.
Nerve crossing.

If some such classification as this were adopted, all chance of misapprehension would disappear.

To turn now to the operation of nerve transplantation, Gluck [3] claimed to have been the first to demonstrate the possibility of transplantation, by inserting 3 cm. of the sciatic nerve of a mouse into that of a guinea-pig. But Phillipeaux and Vulpian,[4] ten years before, working at the question from the standpoint of conduction, demonstrated that a piece of the lingual nerve of a dog could be successfully transplanted into a gap in the hypoglossal.

It was considered at first that the transplanted portion of nerve played an active part, and Gluck spoke of its healing by primary union (meaning union without degeneration). Tillmanns[1] appears to have been the first to suggest that it played a passive part, acting only as the scaffolding to support the new nerve fibre. Recently Ballance and Purves Stewart,[2] as a result of their experimental work, concluded that "the transplanted portion of nerve undergoes degeneration; leucocytes and connective tissue cells invade it from without, and produce fragmentation of its medullary sheaths and axis cylinders. Regeneration occurs later, but when it does occur it is not from the activity of the cells of the graft itself."

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[1] *Brit. Med. Journ.*, London, 1906, March 3.
[2] *Am. Journ. Med. Sc.*, Phila., 1906, March.
[3] *Arch. f. klin. Chir.*, Berlin, 1880, Bd. xxv. S. 606.
[4] *Arch. de physiol. norm. et path.*, Paris, 1870, tome iii. p. 618.

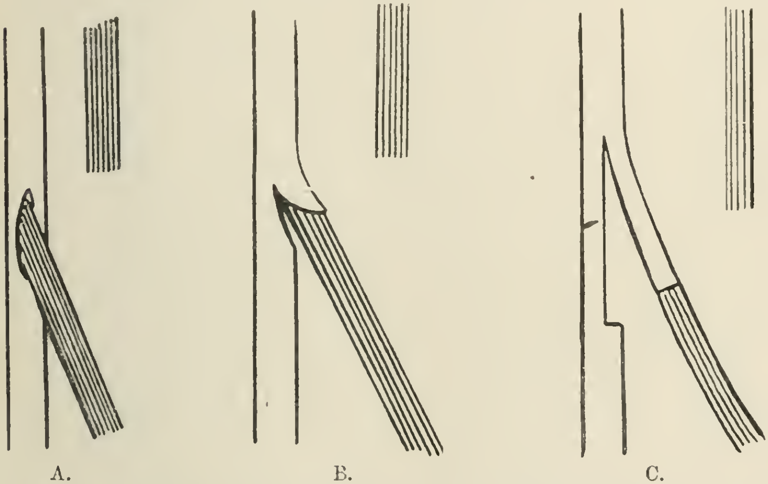

FIG. 2.—Complete peripheral anastomosis, showing the three methods of union.
(A) Insertion of peripheral end of affected into vertical slit in sound nerve.
(B) Insertion of peripheral end of affected nerve into a gap in the sound nerve, produced by an oblique incision.
(C) End-to-end union with flap raised from sound nerve.

This is the teaching which is usually accepted at the present time. Kennedy[3] transplanted an excised portion of a dog's sciatic into the tissues of the animal's thigh, and, on examining it six months later, found the same changes present as took place in the peripheral end of an ununited nerve, that proliferation of the neurolemma cells had taken place. Bethe[4] found that an isolated portion of a dog's sciatic regenerated. Head and Ham[5] observed proliferation of the neurolemma cells in an isolated portion of the radial nerve of a cat. Merzbacher,[6] from his experiments on transplantation, draws attention to the different result obtained when the graft is taken from the same animal (auto-transplantation), or from one of the same species (homo-transplantation), to that when it is taken from one of a different species (hetero-transplantation). He considers with Bethe that degeneration is a vital process seen only in living nerve. He found that a portion of nerve transplanted from the same animal or from one of the same species degenerated, but that necrobiosis and death occurred when it was taken from one of another species. Again, Forssmann,[1] in his experimental work on neurotropismus in rabbits, found that when the graft came from another rabbit regeneration took place as rapidly as after suture. But when from an animal of another species the results were not so good, in some cases no regeneration took place, in others he compares the result to that obtained when the gap is filled in by catgut threads.

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[1] *Arch. f. klin. Chir.*, Berlin, 1885, Bd. xxxii. S. 923.
[2] "The Healing of Nerves," p. 101.
[3] *Brit. Med. Journ.*, London, 1904, vol. ii. p. 729.
[4] "Allgemeine Anatomie u. Physiologie des Nervensystems," 1903, S. 198.
[5] *Journ. Physiol.*, Cambridge and London, vol. xxxii.
[6] *Neurol. Centralbl.*, Leipzig, 1905, Bd. xxiv. No. 4.

In Ballance and Stewart's experiments only small lengths of nerve were used; in no case did they exceed half an inch. It is possible that had larger amounts been employed the results would have been more in conformity with those obtained by other workers. I think we may safely conclude that auto- or homo-transplantation, if carried out with care to avoid injury and so death of the nerve, is followed by degeneration, and later by proliferation of neurolemma cells, changes similar to those which take place in the peripheral end of a divided nerve.

Nerve transplantation was first employed in man by Albert in 1876, who used a portion of nerve from an amputated limb; then by Kaufmann in 1880, who inserted a portion of dog's sciatic into a gap in the musculo-spiral. Mayo Robson was the first to perform the operation in this country, and, so far as I have been able to find in an exhaustive search through the literature, his was the first successful case of this nature. Into a gap in the median nerve, due to resection of a neuroma, he transplanted $2\frac{1}{2}$ in. of the posterior tibial nerve from an amputated limb.

It has not fallen to the lot of any surgeon to perform a sufficient number of these operations to allow of an opinion of their relative value to be formed from personal experience. I am compelled, therefore, to fall back upon collected cases, and with those who have previously worked at the subject find it extremely difficult, in many cases impossible, to obtain from the records any idea of the result of the cases.

I have kept the instances of transplantation of human nerve separate from those in which animal's nerve has been used. There is no doubt that the results are much better in cases of auto- and homo- than in those of hetero-transplantation.

I have verified the cases recorded by Powers[2] and Petersen,[3] and added eight to their twenty-two cases.

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[1] *Beitr. z. path. Anat. u. z. allg. Path.*, Jena, 1900, Bd. xxvii. S. 407.

[2] *Ann. Surg.*, Phila., 1904, vol xl. p. 632.

[3] *Am. Journ. Med. Sc.*, Phila., 1899, April.

Taking first the examples of transplantation of human nerve (Table I.), out of eight cases only three are reported at a sufficient interval after operation to admit of recovery. Of these cases, two recovered completely (3 and 8), and Case 5 showed no sign of motor return seventeen months after operation.

Out of the twenty-two instances of hetero-transplantation (Table II.), sixteen (Cases 3, 5, 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21) were reported at a period after operation which would have admitted of some recovery. Out of these only one (No. 6) can be said definitely and beyond cavil to have recovered, that is, it is the only case in which an account is given of the electrical reaction of the muscles, and it is well to count no case a complete success unless this is given. Nos. 5, 8, 13, 14, 18, and 20 were certainly improved as the result of the operation, and of these perhaps two (Nos. 14 and 20) completely recovered. It may perhaps be profitable to study these cases a little more fully.

In Case 5 the patient was able to raise the hand to the horizontal ten weeks after operation. This is unusually early but as it is a movement which cannot be performed by other muscles than those supplied by the musculo-spiral nerve, we may take it as evidence of commencing recovery.

The median nerve was affected in Cases 8 and 13. The reports are by no means convincing; in No. 8 there is no note as to the action of individual muscles or of their electrical reactions, and the report given of No. 13 is that the hand is "lame but very useful, sensation quite restored for objects larger than a horse-hair." This would describe well the condition of the hand after division of the median nerve if deep sensibility were well marked and need connote no recovery. I have pointed out elsewhere[1] the great care necessary in interpreting the results, both sensory and motor, after division of the median nerve.

In Cases 14, 18, and 20 the ulnar was the nerve affected. Nos. 14 and 20, from the patients' point of view, were perfect successes; No. 18 was certainly improved.

Taking, then, the very liberal estimate of six successes out of sixteen cases, this is not nearly so good a result as that obtained after transplantation of human nerve. The clinical agree, therefore, with the experimental results.

Successes have been recorded from time to time in cases operated upon after the two following methods, but they have one defect in common,—it is almost impossible to prevent the ingrowth of fibrous tissue between the ends of the nerve, which renders complete recovery improbable.

In the flap operations performed after the method of Létiévant, considerable injury is done to the nerve above and below the point of suture, and a complicated nerve wound is left, which may become adherent to the surrounding structures, and bound up with fibrous tissue, unless special precautions are taken. The amount of injury which is inflicted on the nerve is also excessive.

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[1] "Erasmus Wilson Lectures," *Lancet*, London, 1906, March 17, 24, and 31.

Passing now to the methods in the third group. These all aim at preserving a free passage for the neuroblasts, or the down-growing axis cylinders (according to the school to which the surgeon belongs). This has been attempted by "union at a distance" with catgut, alone or combined with tubular suture, that is, surrounding the ends of the nerve and the catgut with tubes of aseptic decalcified bone, aluminum, collodion, or preserved artery. This method has given results equal to those obtained by the transplantation of animal nerve.

The possibility of union of the motor nerves supplying different groups of muscles attracted the attention of investigators at an early date. Flourens[1] was successful in his attempts to cross the nerves of the brachial plexus of the fowl. Rawa[2] crossed the peroneal and tibial nerves with success, but no microscopic examination was made. It was by the well-known work of Kennedy[3] that the possibility of nerve crossing was accurately demonstrated. More recently, Langley and Anderson[4] have shown the possibilities and limitations of nerve crossing.

So far as I have been able to ascertain, Manasse[5] was the first to investigate experimentally what we understand as nerve anastomosis. He began his experiments on dogs in 1898. Out of five in which he united the peripheral end of the divided facial nerve to the side of the spinal accessory nerve, in three instances the muscles reacted again to the interrupted current four months after the operation.

The work recently done by Kilvington[6] is a valuable contribution to our knowledge of this subject. He used dogs, and found that when the central end of the divided sciatic was sutured to the peripheral ends of the external and internal popliteal nerves, recovery ensued and co-ordinated movements were re-established. He found, on counting the axis cylinders, that a single axis cylinder in the central end had established communication with an axis cylinder in each peripheral end; this is important in considering what is the best operation to adopt. In his most successful case he divided the internal popliteal nerve into two portions, the smaller of which he united end to end with the divided external popliteal, the larger to the peripheral end of the internal, and obtained a perfect recovery in 141 days.

In discussing operations of this nature, it is essential that we keep the operation of nerve crossing quite distinct from that of anastomosis; up to the present this has not been done. It is quite obvious, for example, that we cannot consider together the results of insertion of the peripheral end of the facial nerve into a slit in the hypoglossal with division of the hypoglossal and end-to-end union with the facial; we can only compare them to see which gives the most favourable result.

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[1] *Ann. d. sc. nat.*, Paris, 1828, p. 13.
[2] *Arch. f. Physiol.*, Leipzig, 1885, Bd. ix.
[3] *Phil. Trans.*, London, 1901, vol. cxciv. p. 127.
[4] *Journ. Physiol.*, Cambridge and London, vol. xxxi. p. 5.
[5] *Arch. f. klin. Chir.*, Berlin, 1900, Bd. lxii. S. 805.
[6] *Brit. Med. Journ.*, London, 1905, April 29, Sept. 16.

In nerve anastomosis an attempt is made to bring the axis cylinders of the affected nerve into end-to-end contact with *some* of those of the sound nerve; in nerve crossing the peripheral end of the affected nerve is united end to end to the central portion of a divided sound nerve. This latter operation was first carried out on animals, but surgery led the way for experimental research into the question of nerve anastomosis. Létiévant[1] appears to have been the first to recommend this method, under the name of "greffe nerveuse." He had, however, no opportunity of carrying it out. To Despres (*vide* Table III.) appears to be due the credit of first performing the operation. He inserted the peripheral end of the median nerve between the separated fibres of the ulnar. The case was reported two months after the operation, and has been considered on insufficient evidence to be a success. The next case was not recorded until 1886 (Gunn); this was also unsuccessful, and it was not until 1897 that a recovery by this method was recorded. Two months after rupture of the musculo-spiral nerve in a compound fracture of the humerus, a flap of the median nerve was raised, and the musculo-spiral united end to end with it. Two years and three months later, all the muscles of the forearm, except the extensor longus pollicis, acted normally and reacted to stimulation with the interrupted current (Sick and Sanger). Excluding the cases in which the operation was performed on the facial nerve, I have been able to collect twenty-five examples (*vide* Table III.), of these twelve (Nos. 3, 4, 6, 8, 10, 11, 14, 15, 16, 21, 23, and 24) were reported at a sufficient time after operation to enable an opinion to be given as to the result. In two only is the electrical excitability of the muscles given (Cases 3 and 11), and both of these were successful. Cases 6, 8, 10, and 24 were certainly improved by the operation, and were probably successful, but the records are too scanty to enable a definite opinion to be given.

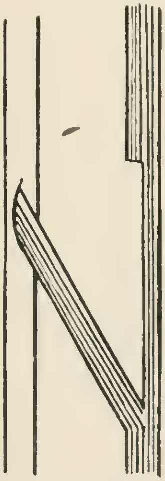

FIG. 3.—Partial peripheral anastomosis. Can also be carried out by methods B and C, Fig. 2.

Case 16 is reported as a success, but no dates are given; Case 21 was improving when reported. With regard to Case 15, the record given two years after operation is not convincing. On referring to the abstract in the table, it will be seen that all the movements of which the patient was capable can be carried out with the nerve completely divided, and that no account is given of the action of individual muscles, either in response to the will or to stimulation with the constant current or of their reaction to the interrupted current.

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[1] *Loc. cit.*, p. 427.

Thus, out of the twelve cases reported sufficiently long after the operation, only two were failures; some improvement took place in all the others. This is a better result than that given by Powers and others, who considered that 50 per cent. were successful.

Many methods of nerve anastomosis are possible; they may be divided into the peripheral and central, the partial and complete. In peripheral anastomosis the affected nerve is divided partially or completely, and its peripheral end brought to the unaffected nerve. (*Vide* Figs. 2 and 3.) In central anastomosis the unaffected nerve is divided partially or completely, and its central end united to the affected nerve. (*Vide* Figs. 4 and 5.) In all cases it should be the aim of the surgeon to bring the cut ends of axis cylinders in contact, for without this, union with the central nervous system is impossible. This contact may be brought about in three ways. (*Vide* Fig. 2.) In the case of small nerves, by making a vertical slit in the nerve a sufficient number of axis cylinders are divided to ensure a good result;

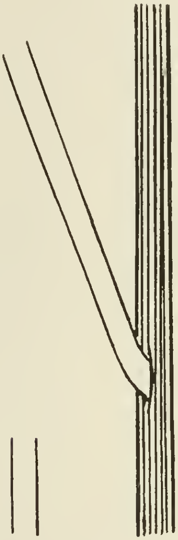

Fig. 4.—Complete central anastomosis. Can also be carried out by methods B and C, Fig. 2.

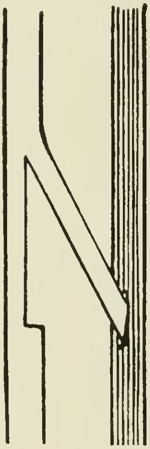

Fig. 5. — Partial central anastomosis. Can also be carried out by methods B and C, Fig. 2.

but in larger nerves, a transverse or oblique cut should be made, and the affected nerve sutured in or a flap raised and end-to-end suture performed. This last method is theoretically the best, as it avoids the possibility of the union of single axis cylinders in the central end, with one in each peripheral end.

When employed in cases of nerve injury in the limbs, peripheral anastomosis will be the operation of necessity. It will be found on reference to the table, that in certain cases the central end of the divided nerve also was implanted, and the question has been raised if this should not be done in every instance. I consider that the results are likely to be better if the central end is not used. It has been shown that the axis cylinders in the central end of a divided nerve have no preference for those of its own peripheral end, but will make connection just as readily with those in the peripheral end of a neighbouring nerve, so that if the central end of the divided nerve is also used there is less chance of the restoration of perfect co-ordinated movement.

We now pass on to the last method which may be employed to overcome the gap between the two ends of a divided nerve in the limb, that of shortening the limb by resection of bone. Originally recommended by Löbker, it has been carried out successfully by Keen and others on the musculo-spiral nerve. I consider it is only justifiable when, as in one of Keen's cases,[1] a false joint is present in addition, necessitating freshening the ends of the bone.

Having seen the methods that are available to repair a gap in a divided nerve, we must consider the operation advisable in particular instances. In performing any operation on a nerve, absolute asepsis and gentleness of manipulation are essential to success, the great hindrance to recovery being the ingrowth of fibrous tissue between the ends; any delay in healing tends to produce this. In addition, if extensive separation of the nerve from surrounding parts has been necessary, it should be protected from forming adhesions by enclosing the bare portion and the junction in sterile Cargile membrane or foil; this should also be done whenever a nerve has been incised.

The method that should be used to fill a gap in the continuity of an injured nerve, depends, in the first place, upon the nerve injured, in the second, upon the size of the gap. The ideal method is undoubtedly to fill it with human nerve. This may be impossible for anatomical reasons, *e.g.*, in division of the facial nerve in the middle ear, or the distance between the two ends may be too great. We do not yet know how much human nerve can be used in this way; success has been obtained with three inches.

The operation is most often necessary in cases of injury to the musculo-spiral nerve. Here the treatment is simple; after preparation of the ends of the nerve, the incision should be prolonged downwards to its bifurcation into the radial and posterior interosseous, and along the course of the former in the forearm. The radial nerve must be dissected out, and as much as necessary resected and sutured in the gap between the two ends of the musculo-spiral. Practically the whole of the radial nerve may be removed in this way without interfering with the sensibility of the dorsum of the hand. This I have pointed out several times.[1]

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[1] *Med. Chron.*, Manchester, 1900, August.

This operation was, I believe, first suggested and carried out by my colleague, Mr. Dean, who performed it in 1896 with a perfect result. (*Vide* Table I., Case 8.) This nerve is, of course, also available for repair of other nerves of a suitable size.

This method may be impossible on account of the size of the nerve, for instance, the sciatic. It may be feasible, in a patient in hospital, to transplant nerve from a recently amputated limb; if this is impracticable, I think the clinical and experimental evidence is against any attempt being made to utilise the nerves of an animal. A portion of the nerve may be split off and united between the ends, and the whole surrounded by Cargile membrane or a decalcified tube, or tubular suture performed.

When the distance between the ends is too great to admit of transplantation, and a nerve of suitable size and function is near, the peripheral end should be implanted into an oblique incision on the sound nerve, and the whole surrounded with Cargile membrane, or a flap of the sound nerve raised and end-to-end union performed. The junction and the raw surface must be covered with membrane.

No permanent damage should result to the nerve into which the peripheral end is implanted; unfortunately the effect on the sound nerve is not always stated in the accounts of these operations. It is possible to raise a flap of one-third or more of a nerve, without producing more than transient paralysis, unless the nerve has been roughly handled.

I have recently spoken at length on the phenomena resulting from incomplete division of nerve, important in connection with this operation, and would refer to that paper for further details.[2]

Passing now to the facial nerve, we have to decide what operation gives the best results, that is, will restore most quickly the power of dissociated movement to the paralysed muscles, with the least injury to the sound nerve.

Of late, largely owing to the work of the Ballances and Purves Stewart, this treatment has come to the fore. Drobnik in 1879 appears to have been the first to operate for facial paralysis by nerve crossing, but the account of this operation was not published until many years later. Ballance in 1895 was the first to perform nerve anastomosis for facial paralysis. This case was followed by Faure and Furet's in 1898, and Kennedy's in 1899. Of late years many cases have been recorded, and many methods used; cases of crossing and of anastomosis have been described and discussed under the same heading. I intend to discuss these two groups separately.

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[1] *Clin. Journ.*, London, 1904, August 31; *Brain*, London, 1905, Summer Number; *Lancet*, London, 1906, March 17.

[2] *Lancet*, London, 1906, March 31.

Until recently no case had been recorded in which dissociated voluntary movements were restored. In 1904, Thorburn [1] wrote of facio-accessory anastomosis, "this latter fact rendered these operations of comparatively slight real benefit." Other writers who collected cases from the literature came to the same conclusion. But this opinion is no longer tenable. Purves Stewart,[2] reviewing Ballance's cases, writes, "Patients are now able to smile emotionally, and to move the face without innervating the trapezius."

We must conclude, then, that a considerable time, it may be five or six years after facio-accessory anastomosis, dissociated emotional movement may return. But in the more recent operations the hypoglossal nerve has been employed, as first suggested and carried out by Ballance, later and independently by Körte; this is the nerve of choice.

The question what operation shall we do to bring the axis cylinders in the peripheral end of the facial nerve into end-to-end union with those of the hypoglossal, has still to be settled. Theoretically, nerve crossing is the best, but it has the drawback of producing a permanent paralysis of one-half of the tongue. Purves Stewart,[1] speaking of this, says, "the hemi-atrophy and impairment of movement due to division of the hypoglossal causes remarkably little inconvenience, no more than a transient awkwardness in mastication, articulation, and deglutition." But our aim should be to avoid even this, and further operations have been devised by surgeons who have adopted this method to prevent these disadvantages. It has been suggested by Taylor to anastomose the peripheral end of the hypoglossal to one of the cervical nerves, and in one instance it was anastomosed to the spinal accessory nerve, through a graft obtained from the great auricular nerve (Case 8, Table IV.). The results obtained by anastomosis to the hypoglossal are extremely good, in one case (31) dissociated movement was present in the angle of the mouth at the end of four months. The cases recorded by Taylor and Clark, in which there was no intentional division of nerve fibres of the hypoglossal, show extremely good results, but it is doubtful if the return of dissociated movement is so early as when nerve fibres in the hypoglossal are deliberately divided. That the paralysis which results from a partial division of the hypoglossal nerve is temporary, is evident from the following case:—

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[1] *Med. Ann.*, 1904, p. 338.

[2] *Westminst. Hosp. Rep.*, London, 1905, vol. xiv. p. 40.

Case.—H. W., a girl, æt. 10, came under my care suffering from facial paralysis, which immediately followed operation for lateral sinus thrombosis. The dissection to expose the facial and hypoglossal nerves was rendered difficult by the amount of fibrous tissue in the region of the internal jugular vein, which had been opened and drained. I finally identified the facial and hypoglossal nerve without dividing any muscles. I found that the facial could not be brought into contact with the hypoglossal except under extreme tension, so I split off one-third of the hypoglossal nerve for about an inch and a half, and united it end to end with the peripheral end of the facial. The left half of the tongue was paralysed for three weeks only. This is no longer than after many cases in which the nerve is slit and the facial sutured into the gap. Four months after operation there was no return of voluntary power to the facial muscles, but the contraction given by them on stimulation with the constant current had lost its sluggishness and was to the normal pole. The left half of the tongue showed slight atrophy, but its movements and electrical reactions were normal.

I have been able to collect forty cases of operation upon the facial nerve. Of these, eight were examples of nerve crossing, two with the spinal accessory and six with the hypoglossal. In all the cases reported sufficiently long after operation, voluntary power was restored to the paralysed facial muscles, but in neither of the cases in which the spinal accessory was used did dissociated emotional movement return. (*Vide* Table IV.) This was present six months after operation in the only instance of crossing with the hypoglossal reported sufficiently late.

Out of the thirty-two cases of anastomosis, twenty were facio-accessory. It will be noticed, on referring to the table, that I have included under the heading of anastomosis instances in which an end-to-end union was made with the branch of the spinal accessory supplying the trapezius, or in two instances the sterno-mastoid; I consider that it should be so classed as being comparable to raising a flap of the nerve, and performing end-to-end suture.

In no case in which a sufficient time had elapsed before publication did some degree of voluntary movement fail to return, but in few cases was it dissociated. In some of those operated upon by Ballance, and in Cases 16 and 17, emotional dissociated movements were restored, and as time goes on more of the cases will pass into this group. But in one instance of Ballance's, seven years, and in one of Furet's five years after operation, no dissociated movement was present.

Turning now to the instances of facio-hypoglossal anastomosis, we find that in no case did voluntary movement fail to return to the paralysed muscles. In Körte's case, three years and four months after the operation, the movements of the face were not dissociated from those of the tongue, but in this case the peripheral end of the facial was sutured to the side of the hypoglossal without freshening the latter.

Improvement took place in every case of nerve anastomosis for facial paralysis, although it was performed for many causes, in most for division or implication of the nerve in the middle ear. In most cases the appearance of the face at rest became normal, and in some, and their number will become greater as time goes on and the necessary re-education of the centres proceeds, dissociated movements were restored and finally emotional movements.

We see, therefore, from a study of reported cases, that the hypoglossal is the nerve of choice, and that some method should be adopted which ensures the contact of a sufficient number of axis cylinders in the peripheral end of the facial and in the hypoglossal. For this reason, I think a transverse incision should be made into the hypoglossal nerve, the peripheral end of the facial sutured in, or a flap raised and end-to-end suture performed.

Following this, as every other operation upon nerves, careful after treatment is necessary if we are to obtain the best results. The nutrition of the muscles must be kept up by massage and the application of the constant current until the first appearance of voluntary power: then the patient must be instructed to exercise the affected muscles.

In discussing the prognosis in any case, we must bear in mind the cause of the paralysis; cases following neuritis due to middle ear disease or other cause cannot be expected to do as well as those in which the paralysis is due to injury. The question now arises, When should the operation be performed in cases due to injury to the nerve in the course of the mastoid operation? If, during the ensuing fortnight, the reaction of degeneration develops, the sooner operation is performed the better: the surgeon will, of course, wait in acute cases until all suppuration is at an end. In paralysis due to neuritis we may justifiably wait for six months.

After operation, no change takes place, as a rule, for four or five months; then it is noticed that the face, when at rest, becomes more symmetrical. A month or two later, voluntary power begins to return and follows the usual order: those muscles nearest the seat of the lesion, in this case those of the chin and angle of mouth, first regain voluntary power. Later, at a period which varies with the age of the patient and certainly with the nerve used (being much more rapid after hypoglossal anastomosis), with the operation adopted and after treatment, dissociated voluntary movement is restored and finally emotional movement.

The success which attended nerve anastomosis for facial paralysis turned the attention of surgeons to the question of the treatment by this method of paralysis dependent on some central lesion, such as infantile paralysis. The operation appears to have suggested itself to many at about the same time.

Hackenbruch is usually credited with performing the first operation of this nature. But nearly three years previously, Peckham, in a case of paralysis of the calf muscles, implanted the nerves supplying the gastrocnemius given off from the internal popliteal into the external. Young operated in December 1902 upon a case in which the paralysis affected the tibialis anticus muscle. He divided its nerves of supply from the anterior tibial nerve close to their origin, and inserted them into a vertical slit in the musculo-cutaneous. Hackenbruch's first case was operated upon in February 1903, and Harris and Low's soon after. Before I had seen the report of these cases, I had discussed the operation with the parents of a child, but it was refused, and it was not until the end of 1904 that I was able to obtain a suitable case.

I have been able to collect thirteen cases from the literature (*vide* Table VI.), and have added three cases operated upon by myself. Probably many more have been done, for Cushing[1] mentions that "many of these operations have now been done," and speaks, without giving particulars, of a child with generalised paralysis upon whom he had operated. The results are distinctly encouraging, and it is to be regretted that more cases have not been recorded. Out of fourteen cases, reported sufficiently long after operation to admit of recovery, voluntary power was restored to some extent in each case, and in some of the cases, notably 6 and 9, the recovery was excellent. In the two cases in which I operated and was able to watch for a sufficiently long period, although voluntary power and electrical excitability have been restored, the muscles have remained weak and have not regained their size, in spite of careful after treatment, and the result is not what I hoped for. But, in spite of this, I am certain that it is an operation that has a wide future and will eventually replace tendon transplantation in suitable cases.

It has yet to be settled what cases should be submitted to operation, at what time after the onset of the disease operation should be performed, and what the operation should be. Suitable cases are those in which a group of muscles, such as those supplied by the anterior primary division of the fifth cervical nerve, those supplied by the peroneal nerve, the calf muscles or single muscles, such as the tibial anticus, are affected; and Baumann[2] found that these composed a large proportion of the cases of infantile paralysis.

The best time for performing the operation will probably be from three to six months after the onset, at which time it is possible to say what muscles will be permanently paralysed, and little contracture will have taken place in the opposing muscles. Yet it is never too late to attempt the operation, for success has been recorded in a case operated upon ten and a half years after the onset of the disease.

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[1] *Johns Hopkins Hosp. Bull.*, Baltimore, 1905, March.

[2] *Monatschr. f. Psychiat. u. Neurol.*, Berlin, 1905, June, S. 485.

Every case must be carefully examined, the paralysed muscles noted, and their electrical reactions tested. Each case is an anatomical study, and an accurate knowledge of the anatomy of the peripheral nerves must be the equipment of any surgeon who wishes to succeed at this operation.

Various operations have been performed. For most cases the complete peripheral anastomosis will be found to be the best; for example, the external popliteal nerve is completely divided and sutured end to end to a flap raised from the internal. It has been suggested that a partial peripheral operation is better in the case of a mixed nerve such as this, on account of the effect of complete section upon sensation. We need pay no attention to this; division of the external popliteal nerve produces little inconvenience to the patient from the sensory side, and sensory recovery is certain to be restored up to a certain point. When the paralysis is limited to one muscle, such as the tibialis anticus, it is sufficient to make a vertical slit in the sound nerve and insert the divided branch into the gap so formed. The central operation should not be performed whenever it is possible to perform the peripheral, for, as will be seen from the diagram, in most cases it can only be partial, and the number of axis cylinders in the affected nerve brought into end-to-end union with those in the sound must be much smaller. In some positions a peripheral operation is impossible, *e.g.*, in the case of paralysis of the quadriceps extensor cruris. Spitzy[1] has suggested that the superficial division of the obturator nerve be divided and inserted into a slit in the anterior crural. He has performed the operation with success on dogs, but, so far as I can ascertain from his writings, not on the human subject.

We have in nerve anastomosis a means of restoring, to a certain extent, the balance of power after paralysis due to central causes. I need only mention that it is also applicable to cases of tic, as first carried out by Kennedy, and to other spasmodic affections; a combination of nerve crossing and anastomosis has been carried out by Spiller in the treatment of athetosis, with great promise of a successful result.

I have said enough to show you that there is a wide field in connection with operations upon the peripheral nerves, and have tried to point out the limitation of our present knowledge, and the lines on which I believe we must proceed in order to obtain still greater success.

In conclusion, I must express my thanks to my friends, Mr. Dean and Mr. Cheatle, for permission to record their unpublished cases; also to Mr. Ballance and Mr. Robert Kennedy for late reports of cases operated upon by them.

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[1] *Wien. klin. Wchnschr.*, 1905, 3; *Am. Journ. Orthop. Surg.*, Boston, 1904, August.

Note on Case 15.—This child was brought to the London Hospital and seen by me, August 16, 1906.

There has been no treatment of any kind since I last saw her, four months after the operation.

The foot is still in the position of talipes equino varus, and the child has been walking on the outer side of the foot. There is marked wasting of the external popliteal group of muscles. Of the muscles supplied by this nerve, the tibialis anticus acted voluntarily, and reacted in a normal manner to the interrupted current. The extensors of the toes and the peronei were not acting, but the former reacted briskly to the normal pole of the constant current (recovering reaction); the latter still showed the reaction of degeneration.

Sensibility is restored in the external popliteal area.

The muscles supplied by the external popliteal nerve, which was divided and anastomosed to the internal, are therefore recovering in the usual order: first the tibialis anticus, then the extensors of the toes, and finally the peronei.

TABLE I.—*Transplantation of Human Nerve (Auto- and Homo-Transplantation).*

No.	Surgeon and Reference.	Condition for which Operation was Performed.	Nerve Used.	Result.
1	ALBERT. (1876.) *Wien med. Presse*, 1885, 41.	Partial resection of median with neuroma.	Posterior tibial from amputated limb.	Patient lost sight of.
2	ALBERT. (1881.) *Wien med. Presse*, 1885, 41.	Resection of neuroma together with portion of ulnar nerve.	Posterior tibial from amputated limb.	Wound suppurated. Graft extruded.
3	MAYO ROBSON. (1888.) *Brit. Med. Journ.*, 1890, vol. ii. p. 624. *Clin. Soc. Trans.*, 1889, p. 120. *Brit. Med. Journ.*, 1896, October 31.	Resection of 2½ inches of median nerve with neuroma.	Posterior tibial from amputated limb.	9 months after operation muscles reacted to the interrupted current. Function perfect 3 years later.
4	ATKINSON. *Ibid.*	Inch of great sciatic nerve accidentally resected during excision of hip.	Immediately sutured in.	No note after sixteenth day.
5	WARD. *Ibid.*	Resection of 2½ inches of median nerve with neuroma.	Median from amputated limb.	17 months later, wasting of thenar eminence. Abduction and opposition absent.

TABLE I.—*Continued.*

No.	Surgeon and Reference.	Condition for which Operation was Performed.	Nerve Used.	Result.
6	HEATH. *Lancet*, 1893, vol. i. p. 1194.	Resection of 2½ inches of ulnar nerve with neuroma.	Posterior tibial from amputated limb.	Last reported 2½ months after operation.
7	MAYDL AND KUKULA. Chipault, "L'Etat Actuel de la Chirurgie Nerveuse," tome ii. p. 493.	Resection of 10 cm. of great sciatic nerve with a neuroma.	Great sciatic from amputated limb.	Amputation necessary on account of recurrence of growth 2 months later.
8	DEAN. Not previously reported.	Rupture of right musculo-spiral nerve from fracture lower third of humerus.	3 inches of patient's own radial nerve inserted into the gap.	Movement began to return in 6 months. I (J. S.) examined him 5 years after the operation. All the muscles supplied by the right musculo-spiral nerve acted voluntarily, and reacted in a normal manner to the interrupted current. Perfect recovery.

TABLE II.—*Transplantation of Animal's Nerve (Hetero-Transplantation).*

No.	Surgeon and Reference.	Condition for which Operation was Performed.	Nerve Used.	Result.
1	KAUFMANN. (1880.) *Rev. des Science Medicales*, 1884, p. 305.	Section of musculo-spiral during sequestrotomy.	Dog's sciatic.	Reported 2 months after operation.
2	GERSUNG. Quoted Damer Harrison, *Clin. Soc. Trans.*, 1892, p. 116.	Primary suture, following resection of median nerve with neuroma.	6 cm. of dog's sciatic.	Reported 2 months after operation.
3	LANGE. Quoted Petersen, *Am. Journ. Med. Sc.*, 1899, April.	Resection of 4 inches of musculo-spiral nerve with neuroma.	Dog's sciatic.	No improvement in 12 months. Neuroma recurred.
4	VOGT. *Ibid.*	Secondary. 16 months after injury to musculo-spiral.	8 cm. of dog's sciatic.	No change 2 months later.
5	LANDERER. *Deutsche Ztschr. f. Chir.*, 1888, Bd. xviii. S. 604.	Musculo-spiral 9 months after injury.	4½ cm. of sciatic of rabbit.	At end of 10 weeks, hand could be raised to horizontal. No later report. No note of electrical reactions.
6	MAYO ROBSON. (1890.) *Brit. Med. Journ.*, 1896, vol. ii. p. 1312.	Median and ulnar, 7 months after injury in arm.	Sciatic nerve of rabbit into gap in ulnar. 2½ inches of spinal cord of rabbit into gap in median.	6 years later, voluntary power had returned to all the affected muscles except the abductor pollicis, and all except this muscle reached to the interrupted current.
7	ATKINSON. *Brit. Med. Journ.*, 1890, vol. ii. p. 624.	Ulnar, 2 hours after injury.	2½ inches of rabbit's sciatic.	Last report 3 months after operation. No note as to condition of muscles.

TABLE II.—*Continued.*

No.	Surgeon and Reference.	Condition for which Operation was Performed.	Nerve Used.	Result.
8	DAMER HARRISON. *Clin. Soc. Trans.*, 1892, p. 166.	Median, 3 months after injury.	2½ inches of kitten's sciatic.	8 months after operation motion first began to return. No note as to individual muscles, no note of electrical reactions.
9	MITCHELL BANKS. Reported by Damer Harrison, *ibid.*	Resection of 4 inches of ulnar with neuroma.	Sciatic of dog.	No late report.
10	MOULLIN. *Lancet*, 1893, vol. i. p. 1516.	Musculo-spiral, 3 months after involvement in callus.	2 inches of dog's sciatic.	Failure.
11	BRADLEY. *Med. News*, 1896, Feb. 8.	Musculo-spiral, 2 months after injury.	5 cm. of dog's sciatic.	No improvement 2 years and 10 months later.
12	WHITE. Reported Petersen, *ibid.*	Musculo-spiral, secondary, no date given.	Sciatic of dog.	Failure.
13	FERGUSON. Reported Petersen.	An inch of median nerve resected with neuroma.	Sciatic of dog.	2 years later, "hand still lame but very useful, sensation entirely returned for objects larger than fine thread or horsehair."
14	PETERSEN. *Ibid.* Also POWERS, "Annals of Surgery," 1904.	Median and ulnar, 5 months after injury.	4 cm. of sciatic of dog between gaps in each nerve.	8 years later, "quite well as regards use of hand."
15	POWERS. *Ibid.*	External popliteal, 6 weeks after injury.	4 inches of sciatic of dog.	8 years later, failure.

16	Durante. "L'Etat Actuel de la Chirurgie Nerveuse," tome iii. p. 489.	Resection of 5 cm. of external popliteal, with neuroma.	Dog's sciatic.	At amputation for recurrence of tumour, graft had completely disappeared.
17	Bowlby. *Lancet*, 1902, vol. ii. p. 199.	3 inches of median, just below elbow, resected for "diffuse fibroma."	3 inches of spinal cord and sciatic nerve of rabbit.	"Muscles never became materially restored."
18	Barker. Head and Sherren, *Brain*, 1905, Summer Number, p. 316.	5 months after gunshot wound of ulnar.	5 cm. of sciatic of sheep.	8 months after the operation, sensibility to prick had begun to be restored. He then left England.
19	Kennedy. Chipault, "L'Etat Actuel de la Chirurgie Nerveuse," tome ii. p. 881.	Median and ulnar 11 months after injury.	5 inches of sheep's sciatic into gap between each.	Personal communication Nov. 1905, 4 years after operation: "There was some improvement in the sensation of the hand, but there was no improvement of a sufficiently marked character to justify the case being considered a success."
20	Ballance. "Healing of Nerves," p. 27, Obs. 36B.	Ulnar, 11 months after gunshot wound.	2 inches of sheep's sciatic.	"6 months after the operation, anaesthesia had entirely disappeared, although the motor functions were still imperfect." Personal communication, Jan. 1906: "This patient went to South Africa, and about a year later he wrote to me to say his arm had completely recovered."
21	*Ibid.* Obs. 36A.	Great sciatic, 9 months after gunshot wound.	6 inches of bullock's sciatic.	"5 months after the operation, no return of motor or sensory functions." Not seen later.
22	Maydl and Kukula. Chipault, tome ii. p. 181.	Musculo-spiral, 8 months after division.	"Small portion" of sciatic of dog.	1 month later, no change.

TABLE III.—*Nerve Anastomosis.*

No.	Surgeon and Reference.	Condition for which Employed.	Method.	Result.
1	Despres. *Gazette Hebd. de Med.*, Paris, 1876, p. 67.	Primary suture.	Median inserted between the fibres of the ulnar nerve.	"2 months later, sensation ; still lost over last two phalanges of index and middle fingers." "Muscles of thenar eminence contract vigorously to electricity."
2	Gunn. *Zentralbl. f. Chir.*, 1886, S. 723.	Resection of neuroma of ulnar.	Sutured to median after denuding its sheath.	3 months later, no definite improvement.
3	Sick und Sanger. *Arch. f. klin. Chir.*, 1897, Bd. liv. S. 271.	Rupture of musculo-spiral in compound fracture of humerus.	2 months later, a flap of the median nerve was raised and sutured end to end with the musculo-spiral.	2 years and 3 months after operation the fingers could be actively extended, but the extensor muscles of the thumb were still paralysed. All the muscles reacted to the interrupted current except the extensor longus pollicis.
4	Neugebauer. *Beitr. z. klin. Chir.*, 1896, Bd. xv. S. 465.	6 weeks after operation for contracture of knee.	External "implanted into" internal popliteal.	8 months later, no improvement.
5	Dumstrey. *Deutsche Ztschr. f. Chir.*, 1902, Bd. lxii. S. 40.	Rupture of ulnar nerve in fracture of elbow.	26 months later, flap of median nerve raised and ulnar sutured into gap.	"At end of 3 months, sensation had improved. No later report."
6	Roswell Park. "International Text-Book of Surgery," vol. i. p. 858.	Gunshot wound of ulnar nerve.	Ulnar to median (no note as to method).	18 months later, sensation almost perfect. "The boy writes well, and does everything with his hand that he could ever do."

7	KENNEDY. Chipault, "L'Etat Actuel de la Chirurgie Nerveuse," tome ii. p. 881.	Division of median and ulnar nerves.	Central and peripheral ends of both nerves inserted into side of radial.	No change 5 months later.
8	REBOUL. *Loc. cit.*, tome i. p. 367.	No note.	Internal inserted into vertical slit in external popliteal.	"Complete and progressive re-establishment of function."
9	DUBUJADOUX. *Loc. cit.*, tome i. p. 374.	Rupture of external popliteal nerve in dislocation of knee.	Implanted into slit in internal popliteal.	Function not re-established 6 months later.
10	DZIEWONSKI. *Loc. cit.*, tome ii. p. 188.	Resection of a portion of external popliteal nerve with sarcoma.	Both ends of nerve implanted into vertical slit in internal popliteal.	10 months later, sensibility improved, muscles acting slightly.
11	TRZEBICKY. *Loc. cit.*, tome ii. p. 189.	Sarcoma involving brachial plexus.	Extirpation of sarcoma, the ulnar nerve only being saved. Nerves implanted into slit in this.	4 years and 2 months later, the elbow could be flexed to a right angle; movements of wrist and fingers almost normal. R. D. had gone.
12	TRZEBICKY. *Ibid.* (1889.)	Resection of sarcoma involving ulnar nerve.	Ends inserted into slit in median nerve.	Died of metastasis.
13	SAWICKI. *Loc. cit.*, tome ii. p. 189.	Paralysis of musculo-spiral following dislocated shoulder.	Two-thirds of musculo-spiral sutured to freshened side of ulnar.	No change in "several months."
14	CODEVILLA. Quoted Powers, *loc. cit.*	No note.	External to internal popliteal.	Failure.

TABLE III.—*Continued.*

No.	Surgeon and Reference.	Condition for which Employed.	Method.	Result.
15	SHELTON HORSLEY. *Journ. Am. Med. Assoc.*, 1906, March 3, p. 639.	Subcutaneous injury of musculo-spiral and median.	2 to 3 months after injury, median found destroyed for $2\frac{1}{2}$ inches in arm, cut across, and peripheral end sutured into a nick in the ulnar nerve.	2 years later, stimulation of ulnar above implantation with constant current, median and ulnar response, the ulnar being stronger. Stimulation of median gives marked contraction, but weak in thumb muscles supplied by median nerve. Flexion of all fingers present. Abduction of thumb present. Partial cutaneous analgesia marked on dorsal surface of middle finger and on palmar surfaces of index and middle fingers. No account of action of individual muscle or of faradic reaction given.
16	SPITZY. Ref. *Lancet*, 1906, May 5.	No note.	Musculo-spiral paralysis treated by uniting fibres of the median with the paralysed nerve.	Successful.
17	TUBBY. *Brit. Med. Journ.*	Erb Duchenne birth paralysis; child of $2\frac{1}{2}$.	Outer cord of brachial plexus implanted into middle.	No change in $3\frac{1}{2}$ months.
18	HARRIS AND LOW. *Brit. Med. Journ.*, 1903, vol. ii. p. 1035.	Rupture, anterior primary division of 5th cervical nerve.	5 divided and inserted into nick in 6.	No late report.
19	*Ibid.*	Neuritis, 16 months previously.	5 divided and inserted into 7.	No late report.

20	CUSHING. *Johns Hopkins Hosp. Bull.*, 1906, March, p. 93.	Rupture, anterior primary division of 7th cervical nerve.	Sutured into slit in cord formed by 5 and 6.	Reported too early.
21	CUSHING. *Ibid.*	Rupture of all cords of brachial plexus.	Spinal accessory implanted into upper cord.	"Has already regained use of upper arm."
22	MOORE. *Intercolonial Med. Journ.*, 1900, p. 582.	Gunshot wound of median nerve in arm.	4 weeks later, sheath of ulnar nerve opened, and both ends of median inserted.	Reported too soon.
23	SPILLER, FRAZIER, AND VAN KAATHOVEN. *Am. Journ. Med. Sc.*, 1906, March, p. 430.	Athetosis.	Left arm median and ulnar nerves divided in arm. Central ends of both and peripheral end of ulnar implanted into musculo-spiral. Peripheral end of median implanted into ulnar, March 16, 1905. April 17, Musculo-cutaneous and circumflex left arm crossed. Right arm, June 13, 1905, circumflex and musculo-cutaneous divided and crossed. Median and ulnar divided; both ends of median implanted into musculo-spiral, both ends of ulnar into median.	November 7, 1905. Is regaining power in flexor group over left side; can flex fingers, wrist, and forearm; slight abduction of arm present. Reactions—deltoid, biceps, extensors of wrist, sup. longus react well to the faradic current. Biceps responds, but not so well. Median and ulnar distribution, in response. Right as left, but less marked.
24	PECKHAM. *Am. Journ. Orth. Surg.*, 1904, August, p. 32.	Paralysis of peroneal group of muscles following injury to the spine.	"Branches from the internal popliteal nerve were inserted into the external popliteal nerve."	Improvement was noticed 2 or 3 months after operation. After one year, improvement still more marked.
25	TUBBY. *Brit. Med. Journ.*, 1906, March 3.	Erb Duchenne paralysis.	"Outer cord of brachial plexus inserted into the middle cord."	No improvement in 4 months.

Table IV.—*Nerve Crossing for Facial Paralysis.*

No.	Surgeon and Reference.	Condition for which Operation was Performed.	Nerve Used.	Result.
1	Drobnik. (1879.) Chipault, "L'Etat Actuel de la Chirurgie Nerveuse," tome ii. p. 189.	No note.	"Peripheral end of facial to central end of divided external branch of spinal accessory."	After several months, face more symmetrical.
2	Ballance. *Brit. Med. Journ.*, 1903, May.	Facial nerve involved in tumour, divided in its removal. Woman of 44.	Hypoglossal.	Reported too soon.
3	Cushing. *Annals of Surgery*, 1903, May.	5 weeks after bullet wound in man of 30.	Spinal accessory.	In 81 days, face symmetrical at rest. 6 months, condition approaching normal. 287 days, electrical reactions normal. Individual co-ordinate movements good, but attempts at moving shoulder still cause facial muscles to twitch. Emotional movement not restored.
4	Frazier and Spiller. *Univ. Penn. Med. Bull.*, 1903, November.	5 months after bullet wound.	Hypoglossal.	No late account.
5	Nicoll. *Lancet*, 1903, October 3.	For convulsive tic.	Facial and hypoglossal divided, peripheral end of facial joined end to end with central of hypoglossal.	Reported 2 months after operation.

6	Bardenheuer. *München. med. Wchenschr.*, Bd. li. S. 1273.	Cellulitis of face, nerve divided in operation.	Hypoglossal united end to end with pes anserinus.	At end of 6 weeks, improvement in face at rest. Slight return of voluntary power.
7	Cheatle. *Brain*, 1904, vol. xxvii. p. 437. Personal communication.	14 days after mastoid operation in woman of 26.	Hypoglossal.	In 4 months, deformity of face at rest was slightly less. Slow outward movement of angle of mouth on pushing tongue into opposite cheek. 6 months, dissociated emotional movement of angle of mouth, cannot close right eye. 7 months, muscles react to faradism.
8	Cheatle. Not previously reported.	7 years after mastoid operation in woman of 27.	Hypoglossal. The peripheral end of hypoglossal was joined to spinal accessory by means of a portion removed from great auricular nerve.	In 7 weeks, faint trace of movement in angle of mouth. In 4½ months, dissociated movement of angle of mouth possible, but still retracts on moving tongue. Voluntary power returning to forehead muscles.

TABLE V.—*Nerve Anastomosis for Facial Paralysis.*

No.	Surgeon and Reference.	Particulars of Case.	Method Used.	Result.
1	BALLANCE. *Brit. Med. Journ.*, 1903, May 2.	Boy, 11. 6 months after mastoid operation (1895).	Sheath of spinal accessory slit, and facial sutured in.	No voluntary dissociated movement present 7 years after operation. On raising shoulder, left side of face contracts.
2	*Ibid.*	Woman, 23. 8 months after paralysis from otitis media.	As above.	No return of power in 9 months. 10½ months, an acting and reacting to interrupted current, but no voluntary dissociated movement.
3	*Ibid.*	Woman, 33. 6 months after mastoid operation.	As above.	First sign of recovery in 3 months. No dissociated movement in 10½ months.
4	*Ibid.*	Woman, 36. 4½ months after mastoid operation.	As above.	First sign of recovery in 4½ months. Sterno-mastoid and trapezius paralysed for 3 months. All muscles reacted to faradism 8 months after operation. No dissociated movement in 11 months.
5	*Ibid.*	Woman, 15. 2 years and 11 months after injury in fractured base.	As above.	Sterno-mastoid and upper trapezius paralysed 2 months. First return of voluntary power, 5 months.
6	*Ibid.*	Woman, 18. 6 months after mastoid operation.	As above.	No return of voluntary power in 4½ months.

7	KENNEDY. *Phil. Trans. Roy. Soc. of London*, 1901, vol. B 194, p. 127. *Brit. Med. Journ.*, 1903, June.	Woman of 46 with facial spasm of 10 years' duration.	Facial nerve divided at stylo-mastoid foramen, and inserted into gap in spinal accessory two-thirds cut through.	First return of voluntary power noticed on 49th day. 15 months after operation face symmetrical at rest. All muscles acting. Shrugging shoulders produced facial spasm. Improvement continuing 4 years later.
8	FAURE. *Gaz. des hôp.*, 1898, March 8. *Bull. et mém. Soc. de chir.*, 1903, p. 839.	Man of 49. 18 months after gunshot wound.	(Jan. 23, 1898.) Peripheral end of facial united end to end with branch of spinal accessory to trapezius.	July 1902. Face asymmetrical, no dissociated movement, muscles contract when scapula raised, and react to interrupted current. July 1903. The appearance of paralysis still persists to a great extent.
9	FAURE. *Bull. et mém. Soc. de chir.*, 1903, p. 839.	Male, 24. 12 months after mastoid operation.	As above.	Muscles reacting to faradism 18 months after operation. Face still asymmetrical, but less marked than before operation. No voluntary dissociated movement.
10	MORESTIN. *Ibid.*	Woman. 12 months after mastoid operation.	As above.	No change for 3 months. Face symmetrical at rest 8 months after operation. 12 months, appearance of face at rest—normal, return of voluntary power, movements dissociated from shoulder. Said to be "completely healed."
11	VILLAR. *Gaz. hebd. d. sc. méd. de Bordeaux*, 1904, vol. xxv. p. 66.	Male, 29. 3 months after mastoid operation.	As above.	Reported too soon.
12	KEEN. *Journ. Nerv. and Ment. Dis.*, 1903, vol. xxx. p. 368.	6 weeks after injury.	End-to-end suture of facial and branch of spinal accessory to sterno-mastoid.	No change in 3 months.

TABLE V.—*Continued.*

No.	Surgeon and Reference.	Particulars of Case.	Method Used.	Result.
13	MINTZ. *Zentralb. für chir.*, 1904, No. 22, S. 684.	Male, 30. 4 months after mastoid operation.	As in 12.	All muscles acting in 6 months. Reaction to interrupted current not restored. Movements not fully dissociated.
14	SZEYNIER. Chipault, *loc. cit.*, tome ii. p. 190. *Fortschr. d. Med.*, 1903, S. 1060.	Male, 20. 3 months after bullet wound.	Sutured to spinal accessory.	First sign of return, 3 months. After a year, "could whistle, elevate the angle of the mouth and close the eye." No note of reaction or dissociation.
15	HACKENBRUCH. *Arch. f. klin. Chir.*, Bd. lxxi. S. 631.	Girl of 8. Facial paralysis for 7½ years, but muscles reacted to both interrupted and constant currents.	Central implantation of two-thirds of spinal accessory.	Sterno-mastoid and trapezius suffered very little. At 4½ months, deformity of face at rest, very slight. 9 months, voluntary power in angle of mouth.
16	LÖHLEIN. Recorded Zesas. *Fortschr. d. Med.*, 1904, No. 25, S. 959.	Young man. Nerve injured in mastoid operation.	"Facial accessory anastomosis."	Return of dissociated voluntary movement. No further particulars given.
17	SICK. *Deutsche med. Wchnschr.*, 1905, S. 652.	Man of 23. 5 months after mastoid operation.	Peripheral end of facial sutured to side of spinal accessory.	Paralysis of trapezius resulted, recovered in 3 months. Restoration of function in face began in 7 months. 25 months, face at rest, normal; emotional movement (both sides of mouth move in laughing). All act voluntarily, and to interrupted current. No note of any action in face when shoulder strongly elevated.

18	GLUCK. *Deutsche med. Wchnschr.*, 1903, Aug. 27, p. V, 275.	Boy. 5 years after mastoid operation.	Sheath of spinal accessory split, and peripheral end of facial inserted.	9 months after operation, face still asymmetrical, no dissociated voluntary movement, face twitches on moving arm. Reacts to interrupted current. 3 years after operation (Zesas, *loc. cit.*), improvement had taken place. The operation appeared to have been successful.
19	PFLAUMER. *Zentralb. für Chir.*, 1906, No. 17, S. 489.	3 months after mastoid operation.	Peripheral end of facial anastomosed to spinal accessory.	18 months after operation, appearance of face at rest, almost normal. All muscles acting voluntarily, but not dissociated from the trapezius.
20	KÖRTE. *Deutsche med. Wchnschr.*, 1903, No. 17.	Female, 38. Primary at mastoid operation.	Peripheral end of facial sutured side to side with hypoglossal (Dec. 20, 1901).	Tongue remained paralysed for 6 months. All muscles except those of forehead acting voluntarily, but not dissociated from tongue, at 11 months, and reacting to interrupted current. Tongue a little wasted. 3 years and 4 months after operation (Zesas), condition not materially changed.
21	ALEXANDER. *Wien. med. Wchnschr.*, 1904, No. 11, S. 463.	5 years after middle ear disease.	Peripheral end of facial sutured to side of intact hypoglossal.	Reported too early.
22	BARDENHEUER AND SAMBETH. *Zentralb. für Chir.*, 1905, No. 2.	16 years after injury to facial nerve, the result of cellulitis of neck.	To hypoglossal. No note as to method.	Reported too early.
23	*Ibid.*	Post-mastoid.	As above.	As above.

TABLE V.—*Continued.*

No.	Surgeon and Reference.	Particulars of Case.	Method Used.	Result.
24	TAYLOR AND CLARK. *Medical Record*, 1904, Feb. 27. *Journ. Am. Med. Assoc.*, 1906, March 24.	Boy, 6. 3½ months after mastoid operation.	Peripheral end of facial implanted into vertical slit in hypoglossal.	Almost complete paralysis, muscles supplied by 12th nerve for some weeks. In 4 months face symmetrical at rest. Voluntary movement in angle of mouth, 8 months; at 25, voluntary emotional movement present; forehead muscles acting.
25	*Ibid.*	45. 3 months after middle ear disease.	As above.	Paralysis hypoglossal, 6 weeks. 4 months, face had almost regained symmetry. 6 months, return of voluntary power angle of mouth.
26	WEIR. *Ibid.*	Woman, 26. 18 months after mastoid operation.	As above.	Paralysis hypoglossal, some weeks. 13 months after operation, face symmetrical at rest. All muscles acting voluntarily, but swallowing accompanied by slight grimace of affected side of face.
27	TAYLOR AND CLARK. *Ibid.*	Woman. Bell's palsy of 12 years' duration. Complete reaction of degeneration present.	As above.	5 months after operation, first return of voluntary power. 11 months after operation, marked return lower part of face.
28	*Ibid.*	Man, 19. 5½ months after mastoid operation.	As above.	No paralysis of hypoglossal. 12 months after operation, return of voluntary motion in muscles of chin and angle of mouth.
29	*Ibid.*	Man, 28. 10 months after mastoid operation.	As above.	No paralysis of hypoglossal. Reported too soon.

30	Hartley. Reported Taylor and Clark. *Ibid.*	Facial spasm.	Facio-accessory. No note as to method.	No note as to result.
31	Tubby. *Brit. Med. Journ.*, 1906, March 3.	Man, 17. 6 months after section.	"An incision was made with a tenotomy knife deeply into the hypoglossal nerve, and the distal end of the facial was then inserted into it by a lateral implantation."	16 weeks after operation, appearance of face at rest almost normal. Dissociated voluntary movement angle of mouth, orbicularis palpebrarum, corrugator supercilii.
32	Sherren. Unpublished.	Girl, 10. 4 months after mastoid operation.	One-half of hypoglossal nerve shut off and united end to end with peripheral end of facial.	Paralysis of corresponding half of tongue for 4 weeks. 4 months after operation, affected side paralysed; no reaction in affected muscles to interrupted current, but react well to 2 milliampères constant current, both poles equal. Tongue: no trace of paralysis, left half slightly atrophied.

TABLE VI.—*Nerve Anastomosis in Cases of Infantile Paralysis.*

No.	Surgeon and Reference.	Muscles Affected.	Time after Onset at which Operation Performed.	Method Used.	Result.
1	PECKHAM. *Prov. Med. Journ.*, 1900, Jan. p. 5. *Am. Journ. Orth. Surg.*, 1904, Aug. p. 32.	Peroneal group.	10 years.	Central anastomosis; divided two of the four branches passing from the internal popliteal nerve to the gastrocnemius, and inserted them into the diseased nerve.	At the end of 6 weeks, toes could be extended. "Decided ability to use the peroneal group of muscles after 2 or 3 months." No apparent weakness in gastrocnemius.
2	YOUNG. *Journ. Nerv. and Ment. Dis.*, 1903, June, p. 369. *Am. Journ. Orth. Surg.*, 1904, Aug. p. 27.	Tibialis anticus.	3 years.	Dec. 4, 1902. Nerves supplying tibialis anticus divided and inserted into vertical slit in musculo-cutaneous.	June 1, 1904: "All the muscles in the anterior tibial region gave a good response to a slowly interrupted faradic current.
3	HACKENBRUCH. *Arch. f. klin. Chir.*, 1903, p. 638. *Deutsche med. Wchnschr.*, 1905, p. 25.	Peroneal group.	15 months.	Feb. 24, 1903. One-third of the internal popliteal raised as a flap and inserted into the trunk of external.	Failure.
4	*Ibid.*	Peroneal group.	9 months.	As above.	Failure.
5	*Ibid.*	Peroneal group.	10½ years.	As above.	4 months after operation, could abduct foot. 8 months after operation, extensors acting. At 18, co-ordinated movement present, muscles did not react to faradism.

6	Warren Low. *Brit. Med. Journ.*, 1903, vol. ii. p. 1035. *Clin. Soc. Trans.*, 1905, p. 1. *Practitioner*, 1905, August, p. 229.	Deltoid, supra and infra spinatus.	6 months before.	Upper part of anterior primary division of 5th cervical nerve, split off and implanted into a transverse cut in 6.	Slight power of abduction noticed in 11 months; this rapidly increased, so that ultimately child could raise arm above head; muscles reacted to interrupted current 15 months after operation.
7	Frazier. *Journ. Am. Med. Assoc.*, 1905, Jan. 21.	Tibialis anticus.	2 years.	As in Case 2.	"The mother feels convinced that improvement in part has occurred."
8	Tubby. *Brit. Med. Journ.*, 1906, March 3.	Gastrocnemius and soleus.	7 years.	Nerves supplying these muscles from internal popliteal inserted into transverse cut in external.	3 months after operation, power of extension of foot very marked. Muscles did not react to interrupted current.
9	*Ibid.*	As above.	6½ years.	As above.	4½ months later, return of voluntary power, which has markedly increased. 9 months after operation, "on standing with the whole weight of the body on the foot, he can raise the heel ½ inch off the ground."
10	*Ibid.*	Peroneal group.	No note.	"External popliteal completely divided and its distal end inserted into the internal."	No recovery in 3 months.
11	*Ibid.*	Peroneal group.	No note.	"Both central and peripheral ends of external popliteal nerve inserted into internal."	No recovery in 7 months.

TABLE VI.—*Continued.*

No.	Surgeon and Reference.	Muscles Affected.	Time after Onset at which Operation Performed.	Method Used.	Result.
12	TUNSTALL TAYLOR. *New York Med. Journ.*, 1906, July 7.	Peroneal group.	2½ years.	External popliteal divided, peripheral end inserted into vertical slit in internal. (Nov. 9, 1904.)	In 92 days could dorsiflex toes. 236 days after operation considerable improvement. Peronei reacted to interrupted current.
13	*Ibid.*	Peroneal group.	10 years.	"External popliteal divided, and transplanted centrally into a portion of the internal popliteal end to end."	120 days after operation foot could be abducted and dorsiflexed and toes extended. Muscles reacted to slowly interrupted faradic current.
14	SHERREN. Not previously reported.	Muscles supplied by anterior tibial nerve.	2 years.	Peripheral end of divided anterior tibial nerve inserted into vertical slit in musculo-cutaneous. (Nov. 11, 1904.)	Slight return of power in tibialis anticus 8 months after operation, and in extensors of toes 18 months after operation. Foot still weak and toes drag in walking. Muscles react to strong faradic current.
15	*Ibid.*	Peroneal group.	9 months.	Transverse cut made in internal popliteal, peripheral end of divided external popliteal inserted. (Feb. 27, 1905.)	No motor recovery during the 4 months that the child remained under observation. No loss of sensibility or motion in internal popliteal supply.
16	*Ibid.*	Erb - Duchenne group.	18 months.	Anterior primary division of 5th cervical nerve divided and its peripheral end inserted into transverse cut in 6. (March 27, 1905.)	No improvement noticed for 13 months, and then biceps found to be acting and just reacting to interrupted current. Deltoid still paralysed.

THE FEEDING OF YOUNG CHILDREN.

By W. A. Potts, B.A. (Cantab.), M.D. (Edin.), M.R.C.S. (Eng.), M.D. (Birm.), *Lecturer in Pharmacology at the University of Birmingham.*

In recent years few subjects have been more studied and discussed than the feeding of infants under one year; few matters of importance have been more neglected than their feeding at a later stage. With regard to the former, although the last word has not yet been written, I would say nothing now, except that it is becoming more and more plain that there never can be any equivalent to the milk of a healthy mother, and that we shall do more for the race by devoting our energies to encourage that, than by an arduous study of the problem of substitute feeding.

The shocking mortality due to improper feeding of infants is well known; it is not yet, however, sufficiently realised that errors made after weaning are equally potent in undermining the stamina of the people. Were proper attention given to the matter, rickets and adenoids would practically disappear, and a host of other children's diseases and ailments be greatly diminished.

Error generally arises from want of appreciation of two important principles, namely—

1. The capacity for salivary digestion is at first altogether wanting, and even later in childhood tends to be deficient.

2. The teeth, directly they begin to appear, require proper exercise.

The first of these will probably not be disputed, though important deductions that follow from it are often overlooked. Salivary digestion being difficult, starch must be presented in an easily digested form; dry toast, therefore, is to be preferred to bread, and special pains must be taken to thoroughly cook potatoes, rice, and other farinaceous foods; at the same time a free flow of saliva and its intimate admixture with the food must be promoted; this can only be effected by thorough mastication of each mouthful; to ensure this the food should be given in as dry form as possible, and the child taught to use its teeth as soon as they appear. Consideration of the first principle, therefore, but helps to establish the truth of the second.

The necessity for mastication is so obvious that it would seem superfluous to discuss the subject. Encouragement and insistence on it have, however, so fallen into disuse in the training of children that the subject can scarcely be passed over in silence. In the absence of any indication to the contrary, it is only reasonable to suppose that the teeth, like all other organs, require exercise as soon as they appear. All young animals constantly practise their developing teeth. If the little rat has a stick, and the young squirrel a nut, to stimulate the incisors, why should not baby have a bone or a crust? Clinical evidence affords proof of the harm of neglecting this, and equally of the benefit from encouraging it. Take an infant suspected of adenoids, and teach him to work his jaws well, and to pound up each mouthful; his nasal obstruction will gradually disappear. Omit to do so, and he will go from bad to worse, till at last an operation, with all its attendant disagreeables, is required. Recently, eminent dentists have shown how decay of teeth is almost always the result of insufficient use. Select a healthy young woman of 25, well developed and of good colour, and look into her mouth; you will almost certainly find a good set of teeth, which show the signs of constant use. On the other hand, pick out a frail, anæmic person of the same age, and you will find a lot of rotten stumps; she will probably tell you that she lives on tea and slops.

The rule that no solid food whatever must be given till the teeth appear is quite definite; equally definite should be the rule that directly the incisors are through the gums, the first step should be taken in discontinuing liquid diet. Milk should still be the staple article, but should be gradually replaced by something more solid.

In connection with the upbringing of children there are many delusions; one has already been exposed. Another, equally rampant, is the idea that children require no teaching in some of the most important matters of life. It has been asserted that they will feed themselves properly by instinct like animals. This is the argument of the ignorant and the indolent. Careful investigation has shown that wild beasts in training their young to proper habits, and even in instilling moral qualities, often display such painstaking wisdom as would put many a human mother to shame. A child cannot eat well until he is shown how. To teach a child to use his teeth is simple enough; patience is all that is required. Directly the teeth appear, someone should sit opposite him while he is feeding, and, performing the proper movements with his own jaws, induce him to imitate. Day after day every mouthful should be watched. This is far too important a matter to leave to a nurse, however well trained; it is the parents' work. By bringing up children to masticate well, a more valuable heritage is provided for them than is obtained where matters of fundamental importance are neglected to pile up a fortune; comfort and luxury can never replace the priceless birthright of a sound constitution.

Having insisted on the necessity for using the teeth, it remains to indicate precisely what the feeding arrangements should be. Let us commence with a child of 9 months, and assume that the feeds are now four in the twenty-four hours, say 9 A.M., 1 P.M., 5 P.M., and 10 P.M. No addition to this is necessary, except that if the child habitually wakes early, and seems to require and be better for it, a half feed may be given at 6 A.M. From this stage efforts should be made to reduce the total number of meals to three. The extra meals should be gradually diminished in amount. No arbitrary rule can be laid down. Sometimes three meals are all that is required at 15 months; sometimes the child is 2½ years old before he can conform to this. As soon as the incisor teeth are through the gums, the child may begin with a crust; here again no hard and fast line should be drawn on account of actual age. A small crust may be given once a day at first, preferably at the beginning of a meal; the number of occasions on which this is done should be gradually extended, and at the same time a bone may be given. The child may have this after his midday meal, when put to bed, and go off to sleep gnawing it, care being taken that the bone is of such a size and shape that it cannot be swallowed; mutton-chop bones are the best; a drumstick from a chicken may also be used, always remembering that the bones of fowls are prone to splinter. If the child does not take to the bone, its attractions may be increased by sprinkling it with a little sugar; only a few shreds of meat should be left attached.

In the case of children over 9 months who have no teeth, fruit juice may be used to vary the diet, and to check the scorbutic tendency of an entirely milk diet, not derived from the mother. Grapes, oranges, and prunes are the most suitable. Such juice may be given at any age, with the proviso that, owing to its acidity, it ought to be kept clear of the milk feeds, and given in an interval, or as a substitute. There is no better prophylactic for rickets, and in many of the digestive disturbances of infants a few spoonfuls, instead of milk, will be found to act at least as well as the more old-fashioned raw meat juice, whose stimulating properties are obtained at the expense of introducing ptomaines and leucomaines.

One of the most valuable foods for children is the potato. This may be given as soon as the teeth can be used. Begin with a small portion, given in a dry form, and not mashed up with gravy. As mastication becomes more efficient, bananas, cooked apples, rice pudding, bread and butter may be tried. At the age of 18 months, a child, supposing his dentition to be normal, should have his meals constituted somewhat as follows:—

Breakfast.—A crust or slice of bread and butter and a large cup of milk.

Dinner.—One potato, or a banana, or a cooked apple, and a rice, macaroni, or other milk pudding.

Tea.—The same as for breakfast. Fruit may also be given at both breakfast and tea, nor is there any objection to a little home-made jam occasionally. Recent revelations as to the amount of preservative often found in jams and canned fruit cause us to hesitate before giving them to young children, who are peculiarly intolerant of boric acid and similar chemical antiseptics. At this age cauliflower and other vegetables and fruits may be gradually added to the diet list; even lettuce is quite well digested by children who have learnt to use their teeth properly. Nourishing soup can be made from vegetables without any meat stock at all; the secret of success is to use a variety of vegetables, and to cook long and slowly, thickening with rice or sago being often an improvement. All kinds of fruit and suet puddings may be allowed. Meat is not necessary for children, and clinical evidence shows that they develop far better without it. If meat is tabooed, how much rather should gravies and meat extracts be forbidden. These contain practically no nourishment, but are loaded with injurious extractives. I have discussed elsewhere the arguments in favour of a fruitarian diet; here it need only be said that it is especially suitable for children, and their almost universal predilection for it is itself an indication.

There is not so much objection to fish as to meat, and when it is really fresh it may well be included in the dietary in small quantities. Fish cakes are excellent if they consist largely of potato. In talking of fish being fresh, it is necessary to remember that the mere fact that it has only just been delivered to the retail dealer is no criterion; many of the big trawlers and fishing smacks are often a week or more at sea, and bring to land fish that has been kept all that time on ice. Under such conditions animal food is not desirable for adults, much less for children.

Once children can bite well, cheese may be given them, if they like it, nor is there any objection to its being used to flavour macaroni, cauliflower, and other plain food. Still the simpler the diet the better; jam and butter should not be allowed together. The slice of bread should be cut thick; thin bread and butter is a direct incentive to bolting; bread should never be new, but preferably two days old. It need hardly be said that bread *and* milk and other sloppy messes stand condemned. Sponge-cakes are not desirable; they are too soft, and often made with egg-powder, an equally serious objection. If meat is given to children, it should never be minced or pounded; it ought to be cut in thin slices, and then divided into pieces from a half to three-quarters of an inch square. It is difficult to swallow meat so cut without preliminary mastication; if that cannot be learned, meat must be avoided. This leads us to formulate an important principle, to the effect that, within reasonable limits, the food a child masticates best is the best for it to have; there is no reason why the child's taste should not be largely consulted. Children properly brought up will probably be found to actually prefer plain bread and butter, and raw fruit, to anything else.

Eggs are better excluded, as a rule; if given it must be only occasionally, and when it is certain they really are new laid. Porridge is an excellent article of food for growing boys and girls, but as a rule does not suit children under six. It should be remembered that its chief use is to enable milk to be taken with benefit.

Most children have a taste for sweets; it is best to regulate this by a judicious allowance of home-made toffee or other wholesome confectionery occasionally at meal times. A proper habit once formed in such matters will tide over many difficulties. Syrup may be allowed, and also honey; the latter is to be specially commended, always remembering that no article of diet is more often adulterated.

It is scarcely necessary to say that the mistake is generally made of giving too much food. No precise rules can be laid down as to amount. If slow eating is insisted on, and no liquid allowed till the solid food has been eaten, the child's instincts will often guide it aright, but children require direction in this matter. The tendency of training should be to check excessive appetite, and make the amount less rather than more. Stuffing is never indicated; those children who are said to require coaxing to induce them to eat enough will generally be found to be attempting a diet more than ample for an adult. Night terrors, constipation, and most other nursery troubles are simply reflexes of an overtaxed digestion.

The question is often asked as to when it is wise to commence tea and coffee. There is only one rational answer—never. If a taste for stimulants is not fostered and encouraged, it will remain latent, with corresponding benefit, in after years.

In conclusion, I must repeat that the most important business is mastication. This is best practised on crusts and bones. It is encouraged by raw apples and nuts, and by not serving the farinaceous food as a slop.

THE THERAPEUTIC VALUE OF FORMIC ACID IN DIPHTHERIA.

By David H. Croom, B.A.Cantab., M.D.Edin., *late House Physician, Royal Infirmary, Edinburgh; late House Surgeon, Royal Maternity Hospital, Edinburgh; late House Physician City Fever Hospital, Edinburgh.*

From the derivation of the word, it would appear as though the disease diphtheria were dangerous mainly from the mechanical or obstructive point of view. While, however, the treatment of this complication has been so perfected as to bring the death-rate from it alone to almost a minimum, the sequelæ and death-rate, due to what may be summed up in the word toxæmia, are still serious, and remain at a practically constant level.

The introduction of antitoxin has diminished the percentage of the death-rate and the effects of toxæmia during the past thirteen years by less than half, but even in conjunction with it the statistics are sufficiently alarming; nor, during the past six years, have they improved to any important extent.

It would appear that, broadly speaking, a sufficiently powerful dose of antitoxin, administered at a time so early in the course of the disease that the toxins are annulled before they can devitalise and cause degeneration in the tissues, is perfect treatment. Such probably is the case, but so different is the resistant form of each individual that the correct antitoxic gauge is as yet undefined, and hence methods have yet to be perfected to aid the antitoxin until, at any rate, it can be assumed that each individual has received, in time and in amount, the number of units necessary for him.

The three main complications which are met with in the disease may be classified as—cardiac failure, paralysis, and albuminuria; and, while an enlarged account of the pathological features found in those conditions would be impossible in this paper, the following is a condensed account of the views generally accepted as to their causation.

The changes found post-mortem are mainly those of degeneration, and it is now believed by most authorities that the degenerative changes occur in the nerve cells as a result of the diphtheria toxin, and that, while these cells may recover, they may atrophy, and that the nerves of which they are the trophic centres undergo Wallerian degeneration and lose their conductivity. As has been shown, also, degeneration may be found only in the muscle, presumably as a direct result of the toxin, and it therefore is assumed that cardiac failure is dependent on either form or on both combined, according as it is progressive or sudden, early or late. Paralysis other than cardiac depends in the same way on either form or on both combined, according as it is benign or general.

The kidney changes are also degenerative, and whilst Variot has disproved that albuminuria is dependent upon the amount of antitoxin, and has, indeed, shown that chronic Bright's disease is no contra-indication to its administration, the amount of albumin is now generally believed to indicate the amount of toxæmia.

Of the three complications, the two most dangerous and important are paralysis and cardiac failure—the latter a variety of the former—and it is in regard to them that treatment hitherto has been confined.

Apart from the local treatment and the large question of antitoxin, the treatment hitherto adopted has been one of stimulation, mainly by strychnine, strophanthus, and digitalis, with the occasional use of hypodermic injections of strychnine or strophanthin or adrenalin chloride.

As stimulants, the one feature common to all these drugs is that they achieve their end mainly by raising blood pressure;

thus, digitalis does so partly by increasing the cardiac force, and mainly by contracting the arterioles by direct action on their muscular coat, and again, in a lesser degree, by stimulation of the medullary and spinal vasomotor centres.

Strophanthus also raises blood pressure, although the action on the arterioles is not present, as in digitalis.

Adrenalin chloride does so almost solely by contraction of peripheral vessels.

Strychnine raises blood pressure by direct stimulation of the vasomotor centre, which, as a result, leads to constriction of the peripheral arterioles.

It would appear, therefore, that from this point of view, as has been pointed out by Bolton in a recent paper, these drugs are not ideal, in that they tend to *increase* the amount of work done by a heart which has a tendency to degeneration.

There are other points also in their action which appear doubtful in this particular disease.

Strychnine, as a nervous stimulant, acts mainly on the central nervous system, and it has been found that the symptoms of the drug are unaltered when the drug is prevented from reaching the peripheral nerves and muscles. It has also been shown that, almost certainly, the motor cells are unaffected, and that any changes—such as enlargement—found in them are due to hyperactivity, and not to the direct influence of the drug.

As has been shown, however—(1) The main changes in the diphtheritic cord are in the motor cells; (2) many of the paralyses in diphtheria are not central but peripheral or muscular.

It would appear, therefore, that the therapeutic value of strychnine in such a condition must, theoretically, be very limited; for, in addition, it is a known fact that, while small doses of strychnine increase muscular tone, namely, render them more tense, so that they are prepared for immediate contraction, this is due to the action on the cord and not on the muscle fibres.

One other doubtful feature in the treatment by strychnine is the reaction and depression which follow its use, and which Cushny suggests are due to the hyperactivity of the lower parts, lessening the activity of the brain. Here, again, in the treatment of a disease in which paralysis is such a marked feature, it would seem that there is a contra-indication, and that, while expecting in severe cases by pushing strychnine to obtain a temporary benefit, the final result would only be exaggerated.

One other negative point in the treatment of diphtheria by drugs such as these mentioned is, that they make no claim to influence the third complication of diphtheria, namely, albuminuria, and would appear again by raising blood pressure to aggravate the kidney condition.

In formic acid and the formates, the stimulant properties are not attained so markedly at the expense of blood pressure; their action is muscular, while their effects are much more lasting; and it was mainly due to these facts that an attempt was made in the accompanying cases to test their therapeutic value in this disease —an attempt which appears, so far, to warrant a prolonged trial.

While a detailed account of the experimental work of Clement and Huchard is impossible here, it may shortly be said that their observations have proved formic acid to be a powerful stimulant of all striped muscle, and, as shown by ergogram and dynamometer, to give a markedly increased capacity for work. Given in small doses in the form of a colourless fluid of a concentration of 25 per cent., specific gravity 1060–1063, it markedly improves the appetite and general nutrition.

While this is so, an equally important fact, as shown by these investigations, is that the effect on the muscle is prolonged, and a muscle so treated and subsequently exhausted recovers its energy very rapidly.

Although, if given in a concentrated form, the effect is to produce a distinct rise of blood pressure, the administration of the 25 per cent. solution is attended with such a slight increase as not to be of importance even in advanced arterio-sclerosis of cardiac lesions.

Both Clement and Huchard record the diuretic action of the formates, and the influence in diminishing albuminuria in sclerosis of the kidney; while Jarrique confirms their observations, as regards more especially formate of soda, with, in some cases, astonishing results.

From such experimental evidence alone, it would seem that formic acid and the formates have properties likely to be of use in diphtheria, and the statistics of the accompanying 100 cases treated by it appear to bear this out.

The cases were on admission given 5 minims to 20 minims—varying with the severity of the case and the age of the patient—of the 25 per cent. solution of formic acid four-hourly for ten to fourteen days. This was reduced to 5 minims to 10 minims, t.i.d., for fourteen to eighteen days. Otherwise, treatment was as formerly as regards the amount of rest, antitoxin, and diet, and these were in the same proportion as in previous cases. In cases requiring hypodermic injections, formate of strychnine was administered in doses varying from $\frac{1}{100}$ gr. to $\frac{1}{40}$ gr. No other drugs were used, except in the use in laryngeal cases of tinct. belladon., which was given in varying minute doses until dilatation of the pupils was present.

The cases were in no way selected, being taken strictly in rotation on their arrival in hospital, the only cases not included being those in which the clinical diagnosis was not fully substantiated by the bacteriological examination.

In order to analyse more thoroughly the results of treatment in the foregoing cases, a careful analysis has been made of three series of cases from the same hospital, each series numbering 100 cases. In order that the type of the disease might be as similar as possible in the control cases as in those treated by formic acid, two series, each of 100 cases, have been considered in 1904 and 1905, each as nearly as possible in the same months of the year, namely, January, February, and March.

The remaining 100 cases are those immediately preceding the cases treated by formic acid, so as, if possible, to ensure that the particular epidemic did not vary in any degree from those of other years.

There are then 200 cases taken from the corresponding season of the year for the past two years, and 100 cases which may fairly be said to be of the same epidemic as that considered.

On the same principle, but with more minuteness, the relative severity of the two groups of cases may be adjudged as follows:—

1. *The average dose of antitoxin* for the control cases, namely, for 1904 = 6400, for 1905 = 4760, and for 1905–1906 = 4820 units, while that for 1906 (the cases treated by formic acid) = 6265 units. As the doses of antitoxin in the hospital have been prescribed for the past four years, and also for the 100 cases treated with formic acid by the same individual acting on the same fixed principles, it would appear that from this standpoint the cases were of quite as great if not greater severity.

2. *The average age of the patients* in the control cases was—for 1904 = 9·7, for 1905 = 12·5, for 1905–1906 = 10·5, while that for 1906 was 11·3; and thus, varying as the mortality in this disease does with the age of the patient, from this standpoint again, the cases are at least as severe as the preceding ones.

STATISTICS.

STRYCHNINE, ETC., 1904, January to March.

Analysis of Cases, January to March.

No. of Cases.	Died. Cardiac Failure.	Paralysis.	Albumin.
100	10	17	45

Analysis of Paralyses.

Paralyses.	Palate.	Accom. and Recti.	Extremities.
17	7	6	6
	Palate + legs = 5 ,, + recti = 3 ,, + accom. = 3	Accom. + recti + legs = 4 ,, + ,, + palate = 3	Legs + accom. = 4 ,, + palate = 5

Analysis of Deaths from Cardiac Failure.

Progressive.	Sudden.	Early.	Late.
7	3	4 Within seven days.	6

STRYCHNINE, ETC., 1905, January to March.

Analysis of Cases.

No. of Cases.	Died. Cardiac Failure.	Paralysis.	Albumin.
100	7	17	30

Analysis of Paralyses.

Paralyses.	Palate.	Accom. and Recti.	Intercostals.	Extremities.
17	8 Palate + legs = 4 ,, + accom. = 3 ,, + recti = 1	8 Accom. + legs = 2 ,, + intercost. = 1 ,, + palate = 4	1 Intercost. + accom.	4 + Palate = 1 + Accom. = 2 + Recti = 3

Analysis of Deaths from Cardiac Failure.

Progressive.	Sudden.	Early.	Late.
4	3	3	4

STRYCHNINE, ETC., 1905–1906, November to January.

Analysis of Cases.

No. of Cases.	Died. Cardiac Failure.	Paralysis.	Albumin.
100	9	8	34

Analysis of Paralyses.

Paralyses.	Palate.	Recti.	Extremities.	Spinal and Muscles.
8	5 Palate + legs = 2	1	3 Legs + palate = 2	1

Analysis of Deaths from Cardiac Failure.

Progressive.	Sudden.	Early.	Late.
5	4	2	7

FORMIC ACID, 1906, January to March.

Analysis of Cases.

No. of Cases.	Died. Cardiac Failure.	Paralysis.	Albumin.
100	2	3	10

Analysis of Paralyses.

Paralyses.	Palate.	Extremities.
3	2	1

Analysis of Deaths from Cardiac Failure.

Progressive.	Sudden.	Early.	Late.
1	1	2	0

COMPARISON OF ANALYSES.

	No. of Cases.	Died.	Paralysis.	Albumin.
1904, . strychnine, etc. =	100	10	17	45
1905, . ,, =	100	7	17	35
1905–1906, ,, =	100	9	8	35
1906, formic acid =	100	2	3	10

Although the broad results of treatment are well seen in the tables of statistics, it may be best to more minutely examine each complication in detail, and to attempt to give an explanation of the results.

With an improvement in the death-rate from cardiac failure from 8·6 per cent. to 2 per cent., it must seem as though formic acid has a distinct and definite effect on this the most serious complication of diphtheria.

Nine of the cases were such as may fairly be said to have shown symptoms and signs of heart failure sufficiently severe as to have warranted a very bad prognosis.

In Case No. 89, cardiac pain, vomiting, obvious toxæmia, irregularity of pulse, pallor, occasional coldness of limbs, systolic mitral murmur, and weakness of the first sound of the heart, are signs and symptoms which, in the original course of the disease, would warrant a prognosis of the worst type, and more especially when occurring late in the course of a severe attack of scarlatina.

Even more striking was Case No. 76, where with symptoms of impending heart failure and toxæmia to a more than marked degree, there was present broncho-pneumonia, and, as in Case 89, complete recovery.

A specially interesting feature in Case 76 is the fact that a hypodermic injection of strychnine hydrochoride as a control had no effect on the pulse or general condition, while with an equal dose of the formate a marked improvement was visible in a few minutes—improvement which was increased and maintained with two similar doses. It may also be pointed out that at the time of administration the pulse was running and almost imperceptible.

One other interesting point is that there were no threatenings of cardiac failure in any of the cases in the very late stages of the disease, a fact which would seem to prove how thoroughly the toxæmic element had been eliminated and how thoroughly the stimulant effect had persisted.

In the two cases which died, the degree of toxæmia prior to the first administration was extremely profound, and it would seem impossible to overcome a toxæmia which had already poisoned every system and organ to such a degree.

The main features in all the cases were—

1. The remarkable regularity of the pulse even after irregularity had been present in most pronounced form. With the exception of four cases, the pulse was regular within four days of administration, and in the majority of cases within three days.

2. The marked improvement in the general nutrition of the patients, as shown by their colour, appetite, lack of depression, etc., which has been marked, as a rule, within three days of administration, and which would point to a successful combating of the toxæmia.

To what may this be due?

As has been shown, the line of treatment carried out in these cases, namely, by formic acid and the occasional use of belladonna, was one of stimulation by practically non-blood-pressure-raising drugs. The former treatment, on the other hand, namely, treatment by strychnine, strophanthus, digitalis, and adrenalin chloride, was, as Bolton has recently pointed out, entirely by drugs which markedly raised blood pressure in different ways but with the same result. If, however, as in diphtheria, the heart is weakened by toxæmia, and the inhibitory apparatus is also affected, as shown by the condition of the pulse, and if degeneration is the almost constant accompaniment, as is the case, it would seem that by raising blood pressure and so increasing the amount of work which the heart has to perform, a contrary result to what is hoped for must ensue—namely, an increase of degeneration and a further strain to the heart.

The addition in occasional laryngeal cases of belladonna, which, in small doses, modifies the inhibitory action of the vagus nerve and so increases the output of the heart, per minute, has been therefore strictly in accordance with views such as these.

The probability seems, however, that the results are due to a combination of this fact with the actual stimulant properties of formic acid, and that with a gradual stimulation of striped muscle all over the body and direct stimulation of the heart, the resistive power of the individual must be enormously increased, unless, as was shown in the two fatal cases referred to, degeneration has already occurred in an advanced degree.

While the percentage of paralyses of other varieties, namely, 3 per cent., is not far different from that of the percentage of deaths from cardiac failure, the improvement in results is much more marked, for it represents a total fall in the percentage rate of 11 per cent., namely, from 14 per cent. to 3 per cent. At the same time, the mild type of the paralysis is noteworthy. Thus: of the three cases of paralysis recorded, two were benign, namely, palatal, and the third a slight paresis of the lower extremities, with very slight alteration in reflexes and a subsequent complete recovery. In the two palatal cases, there was in both cases an alteration in speech only.

The multiplicity of lesions described in this complication of diphtheria renders it the more difficult to give an adequate explanation of the results of this treatment.

As has been shown by Manicatide, many of these lesions are purely muscular, and, with the use in frequent small doses of such a drug as formic acid, results similar to these might be expected.

In those cases where the lesion is primarily central with a Wallerian degeneration of the peripheral nerves, it would seem as though two objects might be kept in view—

1. To give complete rest, and, by using formic acid, to keep the muscular system in tone and the general nutrition good, until the nervous system, if not too severely poisoned, recovered.

2. To attempt to prevent this occurring in a severe form by successfully combating the toxæmia as soon as possible by early

large doses of antitoxin and, indirectly, by formic acid and the formates.

Although the diuretic effect of formic acid and the formates in the disease has not been pronounced, the great reduction in the percentage of albumin, namely, from 30 per cent. to 10 per cent., is noteworthy.

While in one case the amount was great and prolonged, it may be noted that the patient was suffering from pleurisy with effusion and a high swinging temperature. In one other case the appearance of albumin was within two days of admission, and was only present at the most on two occasions. There were in all cases, apart from absence of albumin, no noteworthy features in the urine.

That the formic acid exercises any direct effect on the kidney is difficult to suppose, and it would seem as though the results were obtained chiefly by the general condition of the patient being so good as to be highly resistant to the toxin, while that in the percentage and doses given the blood pressure was not raised and no diuresis ensued.

There can be little doubt that the amount of albumin is, as a rule, in proportion to the severity of the toxæmia, and the explanation of the results obtained would seem to be as stated rather than any direct action of the drug.

It is difficult not to conclude that results such as these are sufficiently successful as at least to warrant a prolonged trial of the drug in this disease. It may be urged that the influence of antitoxin has not been given the prominence due to it, but this has been purposely disregarded as being in the same proportion for the cases given as for the control cases. So far, then, the results appear to show that formic acid has a distinct stimulant effect on the heart, and that, given a not too profound toxæmia before administration, the general nutrition and vitality of the muscles is so improved as to combat with success the toxæmia of this particular disease and assist in preventing a subsequent degeneration.

The cases mentioned came under my observation while house physician under Dr. Claude B. Ker at the City Fever Hospital, Edinburgh, and I have to express my thanks to him for his kind help and permission to publish the results.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Studies in Clinical Psychiatry. By Lewis C. Bruce, M.D., F.R.C.P.E. London: Macmillan & Co.

Among the younger asylum superintendents in this country the name of Dr. Bruce already stands out as a most energetic and original worker. He has published many papers dealing with a great variety of the problems which mental disease at present offers for solution. It is therefore not to be wondered at that he should, amongst other things, have made an endeavour to arrive at a clear understanding in his own mind of that most difficult of all problems, the classification of insanity. Though the title leads one to expect only a series of more or less closely related essays, the book is really a systematic treatise, giving his views as to how recent advances in psychological medicine should influence the question of classification. Like all recent attempts in this direction, his views lean towards those advocated by Kraepelin, but with a special tendency to attribute more and more of causal potency to toxic factors. This is roughly shown by the amount of space devoted to the different varieties of insanity recognised by him. These are mainly divided into the toxic and the non-toxic. The former receives seven and a half times as much space as the latter. He is careful to state, however, that this classification is not put forward as a final solution, but is merely used as a temporary working hypothesis. It will be readily admitted that the present terminology of insanity is most confusing and unsatisfactory, and that little real progress can be made until this mist is cleared away. It is a relief to find that Dr. Bruce does not add to the thickness of the mist by propounding a new terminology.

Amongst the insanities of non-toxic origin, the group first considered, are included exhaustive insanity, that resulting from gross brain disease or traumatism, from anæmia, from deprivation of sense, or from shock, physical and mental. The largest of these groups is the first, which includes cases of what are now called post-febrile and lactational insanities. As to the former, the exclusion of the influence of toxins in their production seems hard to justify. During the height of the late epidemic of influenza, many cases of mental disease occurred which appeared to be due to the poison of that disease. The symptoms were most decidedly those due to a toxin, and it is difficult to see why Dr. Bruce should have relegated these to the non-toxic group. And after all, when the question is more carefully considered, it appears doubtful whether this basis of classification will ever gain a solid footing. All healthy physiological processes are in the long run the result of certain cellular chemical changes. In health these follow a course which must be fixed within certain prescribed limits. If these bounds are transgressed, disease results, and it is more than probable that the abnormal chemical substances produced manifest disease by acting as toxins on the same or other cellular elements. On this view it would therefore be impossible to regard any diseases as entirely non-toxic in origin. Advances in physiological chemistry are proving this more and more conclusively each year, and as knowledge in this direction increases, it becomes more and more probable that this view will ultimately prevail.

Coming now to the series of mental diseases regarded as due to toxic agents, it is found to contain three groups—those due to toxins of metabolic origin, those in which there is evidence of bacterial toxins in the blood, and those due to alcohol and drug toxins. The important difference in the first two of these groups consists in the presence in the latter of a hyper-leucocytosis and the frequent presence of bacterial agglutinins in the blood serum. To Dr. Bruce belongs the credit of directing attention to this important difference. Whether it is a pathognomonic distinction or not, it is a fact which requires explanation and must have a distinct significance. Acute melancholia, paranoia, and senile insanity are the chief forms of mental disease included in the first group, though the reasons for so including them are by no means conclusive. It is suggested that the toxins concerned are pre-urea bodies, and possibly the ethereal sulphates. The investigations on the blood pressure in acute melancholia are of great interest and of much service in prognosis and treatment.

To the second group of toxic insanities are relegated the greater number of cases of insanity as met with in asylums. The chief of these are excited melancholia, acute mania, *folie circulaire*, katatonia, and hebephrenia. Each of these varieties is described and illustrated by typical cases. In this section much interesting information is also given about leucocytosis, bacterial cultures from various tissues, agglutinins in the blood serum, the excretion of urea and chlorides in the urine, and many other interesting and important investigations.

Chapters are then devoted to nervous diseases frequently complicated by mental disease, which include epilepsy, general paralysis, and dipsomania. In these diseases it is claimed that when their subjects become insane there is a conjunction of two diseases, the one nervous, the other mental. This, however, is a view which cannot strictly be maintained. Mental disease is as much a nervous disease as any of those more commonly so called. But the author's meaning is clear, and the distinction may meantime be made.

The next chapter is devoted to a description of states of mental enfeeblement, and the following one to the clinical pathology of mental diseases. In it are collected various facts previously mentioned, and their significance is discussed in greater detail. An excellent chapter on general treatment brings the book to a close.

Dr. Bruce must be heartily congratulated on having written a highly original, interesting, and suggestive book. It is quite the best that has recently appeared on this subject, and will undoubtedly take its place alongside similar classical works. It is not to be supposed that its author has said his last word on the many problems it discusses, and we shall look with expectancy for further valuable work from his laboratory and pen.

On Carbohydrate Metabolism (A Course of Advanced Lectures in Physiology, delivered at the University of London, May 1905). By F. W. Pavy, M.D., LL.D., F.R.S., Honorary Physician to King Edward VII. Hospital, Consulting Physician to Guy's Hospital. London: J. & A. Churchill.

In the course of 130 pages, Dr. Pavy gives a clear, if somewhat wordy, account of his experimental investigations of the metabolism of the carbohydrates in the animal body, and of the theory he has constructed upon the subject.

Briefly stated, his view seems to be that the sugar which normally exists in the blood is an overflow from that which is being assimilated and is on its way to be excreted in the urine. He holds that the carbohydrates of the food are either converted into fat in the epithelium of the intestine or are linked to proteid in the lymphocytes of the villi, and thus carried into the circulation. The liver, with its power of producing glycogen, he regards as a second line of defence against the "contamination" of the blood with sugar.

When he comes to apply his views to the explanation of diabetes, he develops a picture of the disease which does not materially differ from that of other pathologists and clinicians, and which has been so ably drawn by von Noorden. All are agreed that in diabetes the power of using carbohydrates is decreased — Pavy thinks by diminished assimilation at the seat of absorption instead of by diminished utilisation of sugar by the muscles. In more advanced cases, Pavy explains the condition by the action of a "something" in bringing about a faulty katabolism by which sugar is liberated from the proteids, while the usually accepted view is that the non-utilisation of the sugar induces an increased utilisation of proteids with the liberation of sugar which cannot be used and is excreted.

The etiology of diabetes is hardly discussed, but the relationship of the pancreas to the metabolism of carbohydrates and the onset of the disease is briefly considered, and some experiments are recorded to support the theory which the author advances, that the pancreas forms an internal secretion containing an "activating" substance which causes the assimilation of sugar, and the absence of which produces alimentary if not the graver forms of diabetes.

Reference Handbook of the Diseases of Children. By Professor Ferdinand Frühwald; edited, with additions, by Thompson S. Westcott, M.D. (Phila. and Lond.). London: W. B. Saunders & Co.

After more than twenty years spent in study and teaching, the author has, he tells us, brought out the present work to supply the lack of a compact teaching manual. In order to render the compendium useful as a practical reference handbook, the alphabetical classification has been adopted. The translator informs us that the work has attained a notable success abroad, and expresses the hope that the present English translation may at least broaden the point of view and add something of value to an already admirably well-rounded native literature on this important branch of medicine. The author deals with the various subjects treated of from the clinical standpoint; that is to say, he describes fairly fully the symptoms and treatment of the various diseases, but says little or nothing about their pathology. The descriptions given are concise, clearly expressed, and substantially accurate. The author evidently draws largely on his own experience, and the numerous illustrations which adorn the text are nearly all taken from his own cases, and by themselves form an admirable series of clinical pictures. The translation has evidently been carried out with great care.

While it is easy to say a good deal in praise of Professor Frühwald's book, we fear we cannot recommend it as an altogether satisfactory work of reference. A number of important affections do not seem to be referred to at all, and points of great importance in diagnosis are not infrequently omitted. For example, in the description of congenital hypertrophic stenosis of the pylorus, there is no mention whatever of the occurrence of visible peristaltic waves, of the projectile character of the vomiting, or of the prolonged retention of food in the stomach. The practitioner who desires to refresh his memory as to the points of distinction between cretinism and Mongolian imbecility,—conditions frequently confused in young children,—will find nothing to enlighten him in the rather inadequate article on the former subject, while the latter does not appear to receive mention anywhere in the book. Rheumatism is treated as an articular affection, and there is little to indicate that the rheumatism of childhood differs in any marked way from the rheumatism of adult life. Turning to another subject where the differential diagnosis is often difficult, we find under meningitis accounts of epidemic cerebro-spinal, serous, suppurative, and tuberculous varieties, but posterior basic meningitis receives not even bare mention. We do not blame the author for failing to give an account of the percentage method of infant feeding. The section on feeding is more interesting as it stands, as a contrast to the descriptions given in American and English text-books. But omissions such as we have mentioned, and it would be easy to mention more, ought not to occur in a work intended for reference. But the book has its good points as well as its bad ones. Its chief faults are those of omission, and it might be greatly improved in a revised and enlarged edition.

Applied Bacteriology: An Elementary Handbook for the use of Students of Hygiene, Medical Officers of Health, and Analysts. Revised and Edited by C. G. Moor, M.A. (Cantab.), F.I.C., with the co-operation of R. T. Hewlett, M.D., F.R.C.P., D.P.H. Third Edition. London: Baillière, Tindall, & Cox.

In his Preface to this, the third, edition of "Applied Bacteriology," Mr. Moor explains that, owing to the death of Mr. Pearmain, the joint author of previous editions, he has secured the valuable assistance of Professor Hewlett in revising the present edition. Those who are acquainted with the extensive manner in which bacteriology has been applied to assist in the solution of many problems connected with hygiene, will recognise that the co-operation of Professor Hewlett has served to bring the book thoroughly up to date in these matters, and to render it almost indispensable in a Public Health Laboratory. We find here collected together, in a useful form, those procedures which each worker has been obliged to collect for himself from original sources, and which will prove an immense help to those who have not thus provided themselves. In this respect, the third edition forms a notable advance on previous issues, without an undue increase in the size of the volume. The sections on disinfection and on the bacteriological examination of water, sewage, and milk are specially good. There are few omissions, but we were surprised to find no reference to the examination of ice-cream.

In regard to the thorny question of the importance of the bacillus of Hofmann, the authors apparently incline to the view of the bacteriologist rather than that of the practitioner, and consider this bacillus as a different organism, and not a modified form of the diphtheria bacillus. A sentence, emphasised by italics, and one which many practitioners would do well to note when they receive a negative report from a laboratory upon a suspected case of diphtheria, is to the effect that "*any case that presents the clinical symptoms of diphtheria should be treated as such, whether the bacteriological examination enables us to detect the bacillus or not.*" This will be heartily commended by every one who has had experience of the difficulties occasionally presented in the examination of throat swabs.

On the efficiency of the septic tank and bacterial beds as germicidal to pathogenic organisms, the authors state that there is no proof that these organisms may not pass unscathed through these methods of sewage treatment. This statement might be stronger if the authors accept, as they apparently do on p. 147, the recognition of anthrax organisms in the effluent from such a system.

This volume deserves thorough commendation; the illustrations are good, especially the coloured plates; and the book is well printed, though the transposition of letters is not an uncommon fault in its later pages.

The Principles of Clinical Pathology. By L. Krehl, Ordinary Professor and Director of the Medical Clinic in Strasburg. Authorised Translation from the Third German Edition by Albion Walter Hewlett, M.D. Philadelphia and London: J. B. Lippincott Co.

The original editions of Professor Krehl's work "Pathologische Physiologie" are widely recognised as affording a masterly exposition of the principles of physiology and pathology in their application to clinical medicine. The author has had the advantage, as Professor Osler remarks in an Introductory note, of prolonged laboratory training, to which has been added that accurate knowledge of disease to be acquired only by years of clinical observation and teaching. The English translation of Professor Krehl's book will therefore be welcomed by those who are unable to read the work in the original.

The translation is an excellent, though not strictly literal one. Certain abstract discussions have been condensed, and a few paragraphs dealing with important subjects have been added, yet the character and spirit of the original are fully maintained. Just as physiology deals with the functions of the normal body, so pathological physiology is concerned with the functional activity of the organs in disease. The subjects treated of in the work include the disorders of the circulatory and respiratory systems, the blood, infection and immunity, the disorders of digestion, nutrition and metabolism, whilst the concluding chapters deal with fever, the secretion of urine, and the nervous system. The work furnishes the physician with a most instructive account of recent scientific research and theoretical work bearing on the complex problems of clinical medicine, and may be cordially commended to the clinical teacher in particular.

Rational Organotherapy with reference to Urosemiology. By Professor Dr. A. von Poehl, Professor Prince von Tarchanoff, Dr. Alf. von Poehl, and Dr. P. Wachs. London: J. & A. Churchill.

The title of this work is somewhat misleading. Its theme is the manifold virtues of a preparation, *Sperminum-Poehl*, which we find printed in italics on nearly every page. In the first part of the book there is a description of its chemistry, and a large amount of polemical discussion regarding it. It seems that, in order fully to appreciate the action of *Sperminum-Poehl*, a study of urosemiology, or the proportion between the urea nitrogen and the total nitrogen in the urine, is necessary.

"After Professor Poehl has determined this coefficient in many thousands of cases within the last twenty years, he can make the assertion that this coefficient furnishes us with a very exact diagnostic means of estimating the processes of oxidation in general and textural respiration generally. Professor Poehl therefore states expressly that the subjective 'bien être general' finds an objective clinical expression in this coefficient." In another part of the book Professor Prince J. von Tarchanoff reports cases which have been benefited by *Sperminum-Poehl.* The list includes anæmia, pulmonary phthisis, senile debility, diabetes mellitus, tabes dorsalis, and optic atrophy. Could the proprietor of a patent pill claim more? The work is evidently an earnest attempt to press the importance of a particular remedy, but it is unfortunate that so much has been claimed for it. A bibliography of 569 items gives an indication of the fact that little or nothing which could possibly be adduced in favour of *Sperminum-Poehl* has been omitted; but, in spite of this, we question whether English readers will be duly impressed. The book contains a remarkable series of cryptic sentences, some of which are probably due to the difficulties of translation from the Russian text. Minor mistakes are numerous, and occasionally amusing.

Archives of the Public Health Laboratory of the University of Manchester. Edited by A. Delépine, M.S., M.B., Ch.M., Director of the Laboratory and Procter Professor of Comparative Pathology and Bacteriology. Volume I. Manchester: At the University Press, Sherratt & Hughes.

This is the first of a new series of publications by the University of Manchester. Already the University has published series of studies in medicine, history, economics, anatomy, education. Of all the working universities in Britain, Manchester seems to be turning out the most impressive number of excellent studies. The present splendid volume is worthy of those belonging to the other series. It is a collection of seventeen papers, ranging in subject over practically the whole field of public health. The papers are each of them records at once of learned research and experimental verification. They reflect the highest credit alike on authors and on editor. The whole volume is a striking evidence of the determination of a great city to apply science to its own problems. Incidentally the practice of public health gains; because none of the questions handled is peculiar to Manchester alone. Whether it be poisoning by phosphorus, by sulphuretted hydrogen, and by carbon monoxide, discussed by Dr. Oliver, or the spread of typhoid, discussed by Professor Notter, or feeding of the young, by Dr. Niven, or missed cases of infection, by Dr. Newsholme, or vaccination, by Dr. Copeman, or intestinal parasites, by Dr. Perroncito, or any of the other papers,—the whole public health world as well as Manchester is concerned. It is impossible to discuss or criticise papers so loaded with detail. Here it is enough to say that any public health officer that wishes to be reasonably abreast of the predominant public health problems of the moment ought to have access to this volume. Professor Delépine is to be congratulated on the output of his laboratory. He says, "The Editor will endeavour to publish the Archives in such a form as to facilitate reference to various questions which have proved of special importance or interest in the North-Western Districts of England." In the present volume he has certainly succeeded, and we have little doubt that he will equally succeed in the volumes to come.

A Handbook of Diseases of the Nose and Pharynx. By JAMES B. BALL, M.D. (Lond.). Fifth Edition. London: Baillière, Tindall, & Cox.

IN this volume it has been the author's aim to give "a concise account of the diseases of the nose, accessory sinuses, and pharynx, adapted to the needs of the senior student and practitioner." The subject matter has been divided into four parts. In the first part a sketch is given of the anatomy and physiology of the region, general diagnosis, and methods of treatment. The part of the anatomical description which deals with the outer wall of the nose and the antrum of Highmore might with advantage have been more detailed, when it is considered how important it is to acquire a sound anatomical knowledge of these regions.

The second part is devoted to a description of diseases of the nose and naso-pharynx. The article on nasal obstruction is worthy of special mention; it is, however, curious to find a specialist state, when discussing the operative treatment of polypi associated with ethmoidal disease, that the finger should be introduced from time to time, "by means of which healthy parts of the ethmoid can be distinguished"—unless he has a very highly trained "tactus eruditus." In part three the student is presented with an account of the diseases of the accessory sinuses. This part is, with one or two small exceptions, up to date, and is undoubtedly the best part of the book, as the descriptions are very clear and interesting. In part four we find an account of the diseases of the pharynx. A number of formulæ are added, and an index which, like many other indices, is very incomplete. It is rather remarkable that in a fifth edition so many misprints have been allowed to pass, such as "sphino-ethmoidal recess," "isthmus funcium," "loptothrix," and others. In conclusion, we may say that the author has succeeded in his task; and further, that the book may be read not without interest by the specialist.

Appendicitis: its History, Anatomy, Clinical Etiology, Pathology, Symptomatology, Diagnosis, Prognosis, Treatment, Technique of Operations, Complications, and Sequels. By JOHN B. DEAVER, M.D., Surgeon in Chief to the German Hospital, Philadelphia. Third Edition, thoroughly Revised and Enlarged. London: Rebman Ltd.

THE author in his preface records the satisfaction with which he has witnessed the conversion of his critics of the first edition,—"These gentlemen," he writes, "whose ability with the pen exceeded their experience with the knife, now acknowledge the accuracy of the conclusion that an early operation, which they once thought so criminal, is in reality the safest form of treatment."

The present edition has been revised and enlarged, making the book "as nearly complete as it is possible to render a treatise on any subject of such perennial activity and interest as appendicitis."

Deaver agrees with Macewen in his conclusions as to the functions of the appendix, and believes that the cæcum and appendix are of value in digestion. That this is true of the cæcum will be readily acceded, but of the appendix it is open to doubt, if on no other grounds than the perfection of health which follows its removal. It may be also remembered that the entire ileo-cæcal segment of the bowel can be removed on account of malignant or tuberculous disease, with a return to perfect health.

Deaver has devoted great attention to the bacteriology of appendicitis, and is confident that the *Bacterium coli commune* takes by far the greatest part in the production of the disease, while the most important factor in the augmentation of its virulence within the appendix is defective drainage and retention.

As a monograph on appendicitis, this work takes a very high place; it may be cordially recommended to the practitioner and to the surgeon who desire to know what will help them in their dealings with this treacherous malady.

The King's Coroner. By R. HENSLOWE WELLINGTON. Vol. II. London: Baillière, Tindall, & Cox.

THIS is called volume ii., but it is really complete in itself, and gives a clear account of the practice and procedure, judicial and ministerial, of the office of the coroner. The office of coroner is a very ancient one—how old it is impossible to say—though there is evidence that it existed in the time of King Alfred. In early times one of the chief duties of the coroner was to inquire concerning treasure trove, wrecks, whales, and sturgeons, and to secure them for the king's use. The primary duty of the coroner at the present time, namely, to inquire into cases of sudden death, had its origin in a similar purpose, to ensure that the Crown was not deprived of any of its emoluments arising from the forfeiture of the chattels of felons and outlaws. After shortly tracing the origin of the coroner's office, the author divides his subject into four parts.

The first treats of the jurisdiction of the coroner and the procedure before inquest; the second is occupied with the procedure in court; while parts three and four are concerned with the duties of the coroner after the functions of the court are terminated, and with the various official forms or schedules to be used at different times.

The volume has been written by one who is fully conversant with his subject, and will be found to be a most useful handbook by all whose duties bring them in contact with the coroner, or who are interested in his office.

Diabetes Mellitus: Its Pathological Chemistry and Treatment. By Prof. Carl von Noorden. Authorised Translation under the direction of Boardman Reed, M.D. Bristol: John Wright & Co.

Anything written by von Noorden is well worth reading, and this volume is brimful of interest. It embodies the results of a large amount of original work and the opinions of a physician of enormous experience. A striking feature is a certain vein of hopefulness which is found throughout the book, and a perusal of it should go far to stimulate the practitioner who is tempted to look upon the necessary estimations in cases of diabetes as rather a bore, and to reflect that a fatal issue is only a matter of time.

Great stress is laid on the importance of careful treatment in the slighter cases of glycosuria, and on the harm that may follow on the slavish application of the therapeutic details of one case to another. One of the guiding principles is the fact that the diabetic organism is sometimes able, temporarily at least, to regain the power of assimilation for one particular carbohydrate. Hence the value of the "potato cure," the "rice cure," the author's "oat cure," etc.

The "cure" may only be borne for a week, but for that week the tissues are practically free from acetone. The book may be recommended as being practical and helpful. It includes an appendix giving food tables and carbohydrate equivalents.

Appendicitis: its Pathology and Surgery. By C. B. Lockwood, F.R.C.S., Surgeon to St. Bartholomew's Hospital, etc. Second Edition. London: Macmillan & Co.

This work is a personal record of appendicitis cases treated by the author, in which he relates the clinical history, morbid anatomy, and histology of each case in which he has excised the appendix. He believes that the cases show a correlation between the pathological changes and the clinical symptoms; the degree of the former being relative to the severity of the latter. This seems to be very improbable when we consider the great variation in individual patients, and how frequently mild clinical symptoms are associated with numerous and firm adhesions. The author himself remarks upon this on p. 112, Case 27, and again, on p. 278. The practical surgery of appendicitis is amply given, but of necessity from the plan of the work it is much spread out. Mr. Lockwood, while he states little that is new, has done much by careful consideration of his cases to put our knowledge of the subject upon a definite basis. The illustrations and micro-photographs add much to the interest of this work, and the index is useful.

Studies in Anatomy from the Anatomical Department of the University of Manchester. Vol. III. Edited by ALFRED H. YOUNG, M.B.(Edin.), F.R.C.S., Professor of Anatomy. Manchester: University Press.

THIS work is a continuation of two volumes of Studies in Anatomy from the Anatomical Department of the Owens College, published by the Council of the College in 1891 and 1900. It forms the first number of "The Anatomical Series" issued from the University of Manchester. Some of the papers have not been previously published, but others are reprinted from the *Journal of Anatomy and Physiology.*

The subjects discussed vary considerably, and while morphology and development bulk largely in the text, anatomical abnormalities, so dear to the heart of the anatomist, are described minutely, and though less academic, are of much practical interest. Throughout the papers, careful research and accurate observation are manifested, and they well repay careful perusal. To the anatomist, as well as the practical physician or surgeon, they will prove valuable.

Lectures on Midwifery for Midwives. By A. B. CALDER, M.B., M.R.C.S., Lecturer on Midwifery to London County Council. London: Baillière, Tindall, & Cox.

THIS volume contains Dr. Calder's lectures to midwives just as they were delivered. The subject-matter, therefore, is all that can be desired, the arrangement is good, and no space is wasted on subjects outside the province of the obstetric nurse. The treatment to be adopted by the nurse in the various emergencies is clearly and succinctly described.

The illustrations are frequently out of perspective; and the plan of crowding a dozen or more small woodcuts upon one page greatly diminishes the attractiveness of an otherwise admirable work.

NOTES ON BOOKS.

LITTLE need be said in praise of a book—Heath's *Manual of Minor Surgery and Bandaging*, revised by Bilton Pollard (J. & A. Churchill, London)—which has reached its thirteenth edition. Designed as a manual for house surgeons and junior practitioners engaged in dealing with surgical emergency work, and minor surgery generally, the late Mr. Heath's manual has for many years taken a foremost place among books of its kind. The present edition has been fully revised and brought up to date by Mr. Pollard, and will be found a thoroughly practical and trustworthy guide by those holding junior hospital appointments or entering on practice.

Dr. Fowler's little book—*The Operating Room and the Patient*, by Russell S. Fowler, M.D. (W. B. Saunders Co., London and Philadelphia)—contains a detailed account of the operating theatre and its annexes, of the various methods of preparing patients, and all material for operative work, in use at the German Hospital, Brooklyn, U.S.A., as well as a full description of the duties assigned to each occupant of the theatre during an operation. The account given of the whole somewhat elaborate system might be read with interest and profit by all engaged in surgical work, whether as operators, assistants, or nurses. To those who are satisfied that good work can be done with less complicated arrangements, a short statement of the percentage of cases of suppuration following operations on unbroken skin in Dr. Fowler's work, would have been of interest, and might have carried conviction of the advantages of an elaborate technique such as he describes.

This volume—*Essentials of Genito-Urinary and Venereal Diseases*, by S. S. Wilcox, M.D. (W. B. Saunders Co., London and Philadelphia)—the thirteenth of its series, contains a large amount of information presented in the form of answers to a succession of disjointed questions. Unfortunately, the statements made are not always accurate; and the author, in his efforts to condense his subject, appears to have lost his sense of the relative importance of its various parts, for many paragraphs are devoted to answering totally unnecessary questions, while matters of real importance receive scant notice. In the list of affections of the prostate, to take only one example, malignant disease is entirely omitted, while "extrophy of the roof" and "lodged foreign bodies" are two of the five which are apparently regarded as essentials for the student. Wanting as it is in accuracy and conciseness, Dr. Wilcox's book cannot be recommended to the student.

In *Modern Surgical Technique*, by C. Y. Pearson, M.D., M.Ch., F.R.C.S. (London: John Bale, Sons, & Danielsson Ltd.), a full and practical description is given of the procedure demanded by modern surgical methods. On the principle that "dirty hands have destroyed more lives than all the implements of warfare," a large part of the book is naturally occupied by the details which are essential in order to secure asepsis. The various antiseptics are fully described as regards their uses and advantages, and due value is assigned to some of the older substances which have rather gone out of fashion. The methods of preparing dressings, instruments, sponges, the patient's skin, and the surgeon's hands, are discussed, with a special chapter on the sterilisation of ligatures and sutures, and others on needles, drainage, and methods of suture. There is also a plan of an operating theatre, and a description of the preparation and after-treatment of the patient. Though the whole book may not interest any one man, yet every one, from the student to the surgeon, will find in it much that is of interest.

The Hunterian Lectures, on *Phlebitis and Thrombosis*, delivered before the Royal College of Surgeons of England in March 1906 by Mr. Warrington Haward, F.R.C.S. (Baillière, Tindall, & Cox, London), are now before us in book form. They embody the results of much careful investigation and thoughtful study, and contain a fund of useful information on the various aspects of these conditions. The addition of a full index renders the matter easy of reference.

This—*German Grammar for Science Students*, by W. A. Osborne, M.B., D.Sc., and Ethel E. Osborne (Whittaker & Co., London, 1906)—is an excellent little book, which we confidently recommend to all students. It will be found especially useful to medical students, and we have not seen a book which in such small compass contains so much practical information for those who find some acquaintance with German necessary for the pursuit of their studies. Even such as have more than a superficial knowledge of the language will derive benefit from its perusal, and tend to acquire accuracy in the expression of scientific terms.

The Medical Annual.—In spite of exceptional difficulties—the destruction of the publishing offices by fire, and the death of Mr. Lewis Wright through a railway accident—the new volume of the *Medical Annual* (John Wright & Co., Bristol, 1906) lies on our table after only a slight delay. Most medical practitioners are familiar with this well-known year-book, which is so arranged that, despite the growing flood of literature of which it is a product, a bird's-eye view of the progress of medicine may be obtained, so far as that is possible, through the medium of its pages. Among its commendable features we may note the increasing use of stereoscopic photographs, and the short general reviews which are interspersed among the epitomes on special topics. Although, as is almost inevitable, some of these mainly reflect the personal proclivities of the contributors, they are not the less but the more interesting on that account. We have tested the volume in many directions by searching for references to a number of subjects in which progress has been made during the year, and have seldom failed to find the information sought. The enlarged new series of the Annual ought to prosper as much as its predecessor.

Transactions of the American Pediatric Society, 1905, vol. xvii.—The *Transactions of the American Pediatric Society* always contain papers of more than average merit, and the seventeenth volume worthily maintains the high standard of its predecessors. Though considerably shorter than the volumes issued by the Society in recent years, there are several papers in the present number which will repay careful perusal. Amongst them we would specially draw attention to two papers and a discussion on pyloric stenosis in children, in which the general opinion seems to be that while there are many cases in which there can be no doubt as to the diagnosis, there are others in which there must always be considerable uncertainty. Morse contributes a valuable paper on acid auto-intoxication, in which he arrives at the conclusion that the intoxication is always secondary to some other abnormal condition, probably of digestive origin. The volume, which is profusely illustrated, reflects credit alike on the editor and publishers.

An Atlas of Illustrations of Clinical Medicine, Surgery, and Pathology. Fasciculus xxv.—Smallpox. (London: The New Sydenham Society; agent, H. K. Lewis; 1906.) This series of plates consists of illustrations of the different stages and types of smallpox, and, with one exception, were prepared from photographs taken at the Leicester Isolation Hospital by Dr. Allan Warner. The first series illustrates discrete, and the second confluent smallpox, and the value and interest of the pictures is much enhanced by the fact that for the most part they show the progress of each variety in the same patients. Smallpox, in its pustular stage at least, is a condition which lends itself admirably to illustration by photography, and the plates are as successful as any which it has been our good fortune to see. It, however, seems quite impossible to differentiate satisfactorily in pictures the vesicular from the pustular stage, except that the pocks are, of course, fuller and better marked in the photographs of the latter. We are glad to see that no attempt has been made to represent the disease in coloured plates, which are, in our opinion, always most unsatisfactory and unconvincing. On the other hand, Dr. Warner's excellent photographs give an admirable idea of the appearances presented by the disease, and will be of real value to medical men who have not had the opportunity of seeing typical cases. This fasciculus will be of the greatest use for teaching purposes, and teachers of medicine will find it is well worth the guinea which is charged to non-subscribers. Medical men, moreover, who occasionally give popular lectures on the value of vaccination will find in it a very striking series of plates, in each of which the disease is contrasted in vaccinated and unvaccinated persons infected at the same time and from the same source.

The best we can say for this handy and well-printed volume—*Public Health Legislation and Model Bye-Laws*, by Elliott (London, H. K. Lewis, 136 Gower Street)—is that it must achieve its purpose. One cannot always flatter publications written with a purpose. In this instance the student going up for the English Diploma in Public Health has placed in his hands the very thing he wants. In fact we have not come across a better designed book of its kind. The joint authors are to be heartily complimented. It is evident they understand the requirements of their audience.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Polycythæmia Vera.

This remarkable disease continues to attract a good deal of attention, and a number of important papers have appeared concerning it within the past few months. Reckzeh (*Deutsche med. Ztg.*, Berlin, 1905, December 31) describes five cases. He made some observations on rabbits by ligaturing large veins near the heart, with the result that in a day or two cyanosis and dyspnœa were produced and speedily proved fatal, the organs showing marked venous congestion. Polycythæmia vera chiefly affects persons of middle age; the earliest symptoms are usually headache, vertigo, lassitude, and gastro-intestinal disturbance. The most obvious sign is cyanosis, principally of the face and extremities; the fingers are often clubbed. The blood pressure is generally abnormally high; bronzing of the skin has been observed. Next in importance is splenic enlargement, which is variable, but seldom absent. Albuminuria is common. The characteristic blood change is an excessive number of red blood corpuscles, in general not below eight millions; the hæmoglobin is also high, from 125 to 150 per cent., and the specific gravity and albumin content of the blood are above normal. As to the pathology, the question arises, Is the syndrome of polycythæmia with splenic enlargement a disease *sui generis*, or merely an aggregate of symptoms which may arise from one of several causes? French writers regard it as due to primary tuberculosis of the spleen. It seems, however, both that splenic tubercle may exist without polycythæmia [in children, tubercle of the spleen not infrequently simulates splenic anæmia] and that polycythæmia occurs apart from splenic tubercle. A second view of the pathology is that the splenic function is partially abrogated, and that this causes increased production of red cells in the marrow. Third, we have Türk's hypothesis that a primary lesion of the erythroblastic marrow leads first to polycythæmia and cyanosis, and secondarily to spleen and liver tumour. He compares this "erythræmia" to myelæmia, and regards it as a primary, self-existent disease. Reckzeh lays considerable stress on venous stasis (from diminished tonicity of the veins?) as an etiological factor. The disease runs a very chronic course, with relapses. The outlook is bad. Quinine and arsenic are the most useful drugs. Extirpation of the spleen may be useful in case there is primary tubercle.

Watson also discusses the subject in the *Birmingh. Med. Rev.*, 1905, December. In describing the condition of the blood, he states that there is usually a relative leucopenia, with a markedly high percentage of polynuclear cells,—probably an evidence of undue activity of the marrow. The high blood pressure is shown by a sustained percussion wave. Valvular heart disease does not occur. In one case Garrod found an increase of the urinary pigments. Albuminuria is almost invariable. In Watson's case conspicuous alterations were found in the marrow, which was transformed from the yellow fatty to the purple variety, encroaching on the compact bone and rendering it brittle. Microscopically the marrow tissue consisted of nucleated cells and thin-walled vessels distended with blood, the fat cells being represented by only a few scattered vesicles. The new tissue consisted of—(*a*) A profusion of erythroblasts, distributed in irregular clumps; in most of these the cytoplasm was scanty. (*b*) Neutrophile myelocytes. (*c*) A number of cells with smaller, irregularly lobed, and more deeply staining nuclei, with a protoplasm containing very fine eosinophile granules. (*d*) Multinuclear giant cells. Thus post-mortem evidence supports the idea that this is a disease of the bone marrow, which takes on itself an extraordinary power of producing red cells. Before making a diagnosis of polycythæmia vera, congenital heart disease, obstructive conditions in the thorax, and the use of coal tar derivatives must be excluded. Parkes Weber tabulates the connection and sequence of the main symptoms thus—(1) There is increased erythroblastic activity of the marrow. (2) From the polycythæmia ensuing, the viscosity of the blood is increased. (3) The dilatation of the small vessels is partly to lessen the resistance to abnormally viscous blood, and partly to make room for the dilution of the blood. (4) The plethora is compensatory for the increased viscosity, and for the excessive percentage of the total volume occupied by the red discs. (5) Arterial hypertonia is the result of the strain on the circulation. (6) Cyanosis, when present, is due to inadequacy of the compensatory changes which precede it. The extraordinary number of red cells per cubic millimetre requires some explanation, for it has been calculated by Reinert that it would be impossible to pack more than about nine million discs of ordinary size into that volume. Another point deserving comment is the enormous increase in the total blood volume. Haldane, by his carbonic oxide method, estimated that in one patient of this kind the total volume of blood was 6000 c.c., about double the normal quantity. Watson has no doubt that the disease is a separate entity.

Another case of the disease is reported by Lommel (*Deutsches Arch. f. klin. Med.*, Leipzig, 1906, Bd. lxxxvii. Heft 3-4). The patient was a male, æt. 42, who complained of pain and a feeling of pressure in the abdomen, and persistent flushing of the face and eyes, all of two years' duration. His skin and mucous membranes were abnormally ruddy; the glands normal in size; the spleen greatly enlarged. The blood count gave—R.C., 8,231,000; Hb, 140 per cent.; L., 11,000. The red cells were normal, no erythroblasts being found even after much search. The patient was under observation for eight months, during the greater part of which period his condition remained unaltered. Venesection was performed seven times; on each occasion the corpuscular loss was speedily made up. During the last month of life the patient suffered greatly from abdominal pain and distension. On post-mortem examination, there was, in addition to great enlargement of the spleen, extensive old-standing thrombosis of the entire portal system. The yellow marrow of the bones was almost entirely replaced by red marrow. In this case there was no evidence of tubercle, and signs of gout were also absent. Pathologically, the disease must consist either in increased production or diminished destruction of red blood corpuscles. The extensive lymphoid transformation of the marrow renders the latter alternative more probable. During life the patient's sclerotics had a slightly yellow tinge, and the urine contained much urobilin, which suggest excessive breaking down, while the liver gave a marked iron reaction. In the five autopsies of which records exist, lymphoid hyperplasia has been found only by Weber and Watson, who regard it as the primary lesion. Lommel, however, thinks it is a secondary change, similar to what occurs in hyperglobulia with chronic cyanosis from cardiac disturbance, as well as in the hyperglobulia of high altitudes. In an inquiry into the cause of polycythæmia vera, it is of interest to compare the conditions under which certain undoubted forms of polycythæmia occur. Geisboch has described cases of hyperglobulia and increased blood pressure, but with no splenic enlargement. Hess finds that in rabbits injections of adrenalin cause a rise, up to 25 per cent., of the corpuscles in the veins. Better known is the polycythæmia of cardiac disease, particularly when the lesion is congenital. This has been variously regarded as due to excessive loss of fluid, to abnormal distribution of the corpuscles, and to a process compensating for the respiratory difficulty. The hyperglobulia of high altitudes and rarefaction of the atmosphere is now generally admitted; in these conditions there is evidence of unwonted activity of the marrow. Polycythæmia also occurs in poisoning from CO and phosphorus. The causes of increase in the erythrocytes are therefore manifold, but there seems to be a group of cases with certain common features. In the stasis of cardiac disease in high altitudes, and in CO poisoning, there is obstruction to the oxygenation of the tissues which has to be overcome by some such a mechanism as increasing the oxygen-carrying power of the blood. Lommel investigated his case from this point of view, estimating the power of the hæmoglobin to fix oxygen. He found that the oxygen quotient was 0·903, as compared with 1·24 in a normal control subject. This low oxygen capacity in polycythæmia is noteworthy. The obstruction to the portal system from chronic progressive thrombosis in Lommel's case presents some analogy to polycythæmia from heart disease. In the author's opinion, the chronic portal stasis was an important factor in the production of the polycythæmia. The gas exchange of the patient was not much affected. Though he had the characteristic facial cyanosis, there was never dyspnœa. Though the oxygen-carrying power of the hæmoglobin was low, the hæmoglobin itself was 40 per cent. above normal. The enormous rise in the red blood corpuscles is not without effect on the mechanics of the circulation. The viscosity of the blood, which is normally 5·1, was in this case from 10·9 to 11·3. The fact that despite this viscosity the heart was not enlarged shows that *per se* viscosity does not necessarily involve hypertrophy of the cardiac muscle or a rise in arterial pressure. Lommel's conclusions are—(1) In this case the polycythæmia was probably due to portal obstruction; (2) the oxygen capacity of the hæmoglobin was strikingly low; (3) the viscosity of the blood was extremely high, yet the circulation was maintained without the heart becoming hypertrophied.

Under the title "Myelogenous Polycythæmia" Blumenthal records (*Bull. Acad. roy. de méd. de Belg.*, Bruxelles, 1906, December 30) a case which seems to be unique in several respects. The patient was a woman, æt. 31; the malady had lasted nearly her whole life, paroxysmal attacks of headache and dyspnœa having occurred since childhood, while congestion of the face and attacks of cyanosis had occurred during the last ten years. The dyspnœa was spasmodic, and was generally relieved when free expectoration became established. There was some menorrhagia, and the patient also complained of general feebleness and lassitude. She was well nourished, markedly cyanosed about the face, extremities, and visible mucous membranes. The conjunctivæ were injected, and there was slight exophthalmos. The heart was slightly enlarged, and the pulse of high tension—Riva-Rocci, 135 mm. Hg. *The spleen was of normal size.* Blood—R.C., 11,450,000; Hb, 110 per cent.; sp. gr., 1065; L., 11,300; colour index, 0·47. The red cells were normal. The differential leucocyte count was as follows:—*Basophile myelocytes*, 9 per cent.; *neutrophile myelocytes*, 36 per cent.; *polynuclears*, 48 per cent.; *eosinophiles*, 5 per cent.; *lymphocytes*, 2 per cent. During the six months prior to her death the patient's condition did not alter much. She continued to suffer from dyspnœa, which was often alleviated by hæmophysis: her cyanosis and metrorrhagia persisted. The lowest count was—R.C., 7,630,000; Hb, 105; L., 9300, the differential leucocyte count showing the same myelæmia as before. On post-mortem examination the heart was hypertrophied, the valves competent. The spleen was normal, and the other organs comparatively healthy except for engorgement. Microscopically there was some fibrosis of the liver, vascularisation of the lymphatics, and replacement of yellow by red marrow. The noteworthy features of the case are the precocity and chronicity of the malady. The disease had three phases—first, a period of severe, prostrating attacks of dyspnœa; second, a period in which these attacks occurred more frequently but were less intense, and were associated with expectoration; and third, a period of constant oppression, with metrorrhagia and hæmophysis, perpetual headache, mental dulness, and incapacity for work. Under treatment with splenic extract the red blood corpuscles fell, but myelocytes remained abundant. The chief pathological changes were found in the marrow, which showed abundance of red corpuscles, few erythroblasts, absence of polynuclear leucocytes, and a plethora of myelocytes, particularly those containing mast granules. On superficial examination it suggested fœtal marrow, except for the leucopoietic reaction. This case does not fall into any recognised category. Though it in many ways resembles polycythæmia vera, most of the recorded cases of that disease have had a splenic tumour, and none have presented myelæmia. Again, in many cases some primary lesion has been detected; here, the hæmopoietic system alone was involved. There was evidently no erythroblastic reaction of the marrow, despite the polycythæmia; there were neither nucleated red cells in the blood, nor the normal quantity in the marrow. Notwithstanding their number, the red cells were relatively inadequate, as shown by their poverty in hæmoglobin, and the occurrence of cyanosis and dyspnœa. The principal alteration in the marrow was the myelocyte reaction, which was probably the essential lesion. Blumenthal compares the condition to a myeloma, and thinks that the polycythæmia was due to interference with the function of the spleen in destroying red corpuscles.

Koster (*Munchen. med. Wchnschr.*, 1906, May 29 and June 5) also describes a case, but throws no new light on the disease. The chief fact gleaned from his paper is concerning treatment. He gave copious amounts of saline fluid by the mouth and bowel, so as to dilute the blood. At the same time a diet poor in iron was ordered. Oxygen was given to stimulate metabolism. A certain measure of success attended these efforts, particularly as regards the migraine from which the patient suffered from the onset of his illness.

SURGERY.

UNDER THE CHARGE OF

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The Mortality in Operations on the Gall-Bladder and Bile Passages.

A remarkable contribution to the literature of the surgery of the bile passages is made by William J. Mayo of Rochester (*Ann. Surg.*, Phila., 1906, August). It consists of a short review of 1500 operations performed on the gall-bladder and bile passages by the author and his brother, Charles H. Mayo, within the last fifteen years, with special reference to (1) the operation mortality, (2) the permanence of cure, and (3) the period of disability arising from the operation itself—the length of the convalescence.

In the first 1000 cases the mortality was 5 per cent.; in the last 500, it was 3·2 per cent.; or an overhead operation death-rate of 4·43 per cent. These percentages include all cases dying in the hospital at any time after operation, and from any cause, including pulmonary embolus, myocarditis, and other accidental causes not directly traceable to the operation.

Cholecystostomy.—There were 845 cholecystostomies, with a mortality of 2·13 per cent. In those of the last 500 cases the mortality was reduced to 1·47 per cent., and two of the patients died from pulmonary embolism. The author considers cholecystostomy the normal operation, as it is the safest for the average case. As in only one case out of the whole 1500 did gall-stones re-form in the gall-bladder, Mayo points out that this possibility cannot be taken as a valid objection to leaving the gall-bladder *in situ*. He says that it is not wise to remove a functionating gall-bladder unless for some direct indication. This is particularly true if cholangitis is present, as the gall-bladder affords an easy means of drainage, and its conservation enables cholecystenterostomy to be performed should contraction and obstruction of the common duct subsequently occur. Further, the gall-bladder is a safe guide to the deep ducts in the event of future trouble arising in them. The gall-bladder may be excised, however, in cases where the cystic duct is obstructed by a stone, and the gall-bladder takes no part in the biliary circulation; and in thick-walled gall-bladders which have become functionless, as in such cases there is a suspicion of malignant disease. In several cases the Mayos have thus unexpectedly removed what proved to be an early carcinoma of the gall-bladder. As regards the permanency of cure, with the exception of a few instances among the early cases, all the patients have remained well. The average patient is out of hospital in about two weeks.

Cholecystectomy.—In 319 cholecystectomies the mortality was 3·13 per cent.; reduced in the later series to 1·62 per cent. The operation is more difficult and more dangerous than cholecystostomy, especially when the patient is obese, and when the gall-bladder has a broad attachment to the liver. If the disease is confined to the gall-bladder, the permanency of cure is absolute. The period of convalescence is about the same as in cholecystostomy.

Operations on the common duct.—Of these there were 207. They are divided into four groups—(1) Those in which gall-stones were present in the common duct, but without immediately active symptoms; (2) those in which stones were present, and there was active infection, involving not only the common duct, but also the ducts of the liver; (3) complete obstruction of the common duct; (4) malignant disease.

In the first group there were 105 cases, with three deaths; when present, jaundice was moderate, incomplete, and intermittent. The bile was comparatively healthy, containing only a moderate amount of mucus. The patients were usually able to leave the hospital within fifteen days, and the cure was permanent.

Group 2 included sixty-one cases, with a mortality of 16 per cent. In addition to jaundice, the patients suffered from a malarial type of fever. It is in cases of this group that hepatic duct stones are liable to form subsequently. The author has observed seven examples. Coincident enlargement in the head of the pancreas or changes of the duct wall may lead to secondary stone formation. The convalescence lasts for from three to four weeks. In this group the bile was darker, contained a large amount of mucus, and often *Bacillus coli*.

In the third group there were twenty-nine cases, with ten deaths. Almost no bile was found in the ducts, and what was present was thin and of a dark spinach-green colour; in the worst cases the ducts were filled with a clear, colourless, mucoid secretion. In these cases it is an advantage to operate during a remission of the symptoms, if possible.

The cause of death was cholemia with exhaustion, capillary hæmorrhage, and sudden cessation of liver function. All the patients who recovered remained well. The hospital disability was about three weeks.

In the fourth group there were twelve cases, with four deaths. Mayo has had two primarily successful cases of excision of localised cancer of the duct, but the patients did not survive three years. Exploratory operations have proved fatal in several instances.

Relation to pancreatitis.—In eighty-six out of the 1500 cases under review the pancreas was involved to such an extent as to be noticeable on examination, and of these, sixty-seven showed chronic pancreatitis, with hard nodules in the head of the pancreas and near to the common duct. The other pancreatic conditions met with were acute inflammation, subacute inflammation, and cancer. In four cases, supposed to be chronic pancreatitis, a stone was found in the ampulla.

Mayo concludes with a plea for early operation in gall-bladder cases, bringing forward the analogy of the appendix. So long as the disease is confined to the gall-bladder, the mortality should not exceed 1 per cent. When the stone has passed into the common duct, the condition is one fraught with danger from infection of the liver and cholemia.

Cancer of the Rectum.

Martin du Pan contributes a paper on the results obtained in the treatment of cancer of the rectum in the surgical clinic of the University of Berne, and in Professor Kocher's clinic (*Rev. de chir.*, Paris, 1906, July–August). He concludes that heredity, sedentary occupations, habitual constipation, piles, and injuries have not such an important rôle in determining cancer of the rectum as is usually assigned to them. In subjects below the age of 40, the disease is very often of the colloid variety, runs a rapid course, and is very often fatal. The chief obstacle to obtaining good operative results is the insidious way in which the disease begins, so that it is often well advanced before it is recognised. The early diagnosis of the condition depends on digital examination of the rectum in all cases in which the patient complains of any form of disturbance in the bowel. From his statistics it appears that the mean period of survival in cases not operated upon is about twelve months from the onset of symptoms. In cases operated upon, it is fifty-six months—a sufficient argument in favour of operation. The only local contra-indication to operation is the fixation of the tumour. Operation is not to be rejected from the mere height of the growth in the bowel, from the presence of enlarged glands, or from the fact that the growth is adherent to the prostate or vagina. He does not recommend preliminary colostomy, unless there is dangerous obstruction of the bowel. Surgeons tend more and more to restrict the amount of bone removed in performing the posterior operation. Resection of the coccyx is sufficient in most cases. Kocher's median posterior incision, with resection of the coccyx, is the operation of choice. The best treatment of the two ends of the intestine after ablation of the diseased segment, is fixation of the lower end to the anus, with or without invagination into the lower end stripped of its mucous membrane. Circular suture of the two ends after resection ought to be abandoned, on account of the dangers of infection. The peritoneum should be accurately closed, and neither packed nor drained. Great attention should be paid to the after treatment, particularly towards preventing infection of the wound. The best results are obtained by treating the wound by the open method and using irrigation. His statistics show an operation mortality of 14·58 per cent. Local recurrence occurred in 39·7 per cent., usually in the perirectal tissue. Recurrences should be operated upon. As metastasis to the liver is favoured by leaving blood vessels open, all vessels should be securely ligatured at the operation. The most recent statistics, those of Kocher, show that the proportion of radical cures, dating back three years, is about 25·75 per cent.

HYPERTROPHIC STENOSIS OF THE PYLORUS IN INFANTS.

Fisk of New York, in publishing a case of this condition, reviews the literature of the subject (*Ann. Surg.*, Phila., 1906, July). He has found records of 121 cases, of which seventy-one were operated upon. The symptoms usually appear in the second or third week, but they may come on a few hours after birth, or be delayed for a month or more. The diagnosis is based upon a history of progressive wasting; vomiting increasing in frequency and of the pyloric type, that is "explosive" or "projectile"; constipation; dilatation of the stomach, with visible peristalsis, and the presence of a tumour; and the absence of bile in the vomited matter. The tongue is usually clean and the breath sweet. The condition is not to be confused with the simple regurgitation of food so common in infants, or with gastritis.

The chief pathological change, and one which is practically constant, is an increased length and thickness of the pylorus, which is almost of the consistence of cartilage. The thickness is most marked towards the duodenal end, and thins off towards the stomach, so that the pylorus projects into the duodenum in a cone-shaped manner, not unlike the portio vaginalis uteri. Although a probe can usually be passed through the orifice, for all practical purposes the stenosis is complete. The thickening depends chiefly on an excessive development of the circular muscular fibres, and to a less extent of the longitudinal layer. Inflammatory products are scarcely ever present. There seems to be little doubt that the condition is of the nature of a true congenital malformation, and is not due to physiological hypertrophy from repeated muscular spasms.

The only rational treatment is by operation, and in the opinion of the author the preference should be given in selected cases to pyloroplasty, as it is physiologically, anatomically, and surgically the most correct procedure. It has been urged against this operation that it is impracticable on account of the excessive thickness of the pylorus, but the fact that it has been performed in a number of cases with a mortality of 45·4 per cent. shows it at least to be practicable. The majority of surgeons appear to prefer posterior gastro-enterostomy, the mortality of which is 42·5 per cent. Divulsion has been performed, but is now almost entirely given up. Pylorectomy was performed, unsuccessfully, in one case.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF
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False Perforations of the Uterus.

That relaxation of the uterine muscle can occur with or without enlargement of the uterine cavity is well known. When met with during the course of such an operation as curetting, it may give the impression that the uterine wall has been perforated by the instrument. This deceptive appearance is particularly apt to occur when there is some predisposing factor, such as special thinness of the uterine wall, reflex inhibitions, as are often met with in dilatation of the cervix, and negative intra-abdominal pressure. In cases of actual perforation, the point of the instrument can be felt through the abdominal wall, and palpation causes discomfort to the patient. The latter is not felt in false perforation. Further, true perforation is generally associated with signs of peritoneal irritation, rigors, and sudden increase in the pulse rate.—Bovis, *Semaine méd.*, Paris, 1906, May 30.

Heteroplastic Ovarian Grafting.

Morris (*Med. Rec.*, N.Y., 1906, May 5) reports the case of a woman, æt. 21, from whom he removed both ovaries completely. Before the operation he removed a small piece of normal ovarian tissue from a patient operated on for uterine prolapse. It was placed in saline solution at a temperature of 100° F. till the oöphorectomy was performed. A small incision was made through the peritoneum of the broad ligament on either side parallel to the Fallopian tube, and into the edges of this incision the grafts were stitched by a single suture. Four months later the patient menstruated for the first time for over two years. Four years later she was delivered of a normal child.

Effect of Röntgen Rays on the Ovaries in Pregnancy.

Fellner and Neumann (*Centralbl. f. Gynäk.*, Leipzig, 1906, June 2) report the results of a study of the effects of X-rays on pregnant animals. They find that the parenchyma and ova degenerate, causing arrest of the function of ovulation. In cases of osteomalacia where the ovarian secretion is increased, in bleeding myomata at the climacteric, and to sterilise women who from some special reason ought not to become pregnant, the authors believe that the X-rays may be used as an efficient therapeutic agent.

OSTEOMALACIA CURED BY X-RAYS.

Ascarelli (*Riforma med.*, Roma, 1906, May 26) treated a severe case by X-rays, in order to produce atrophy of the ovaries. At the end of two months improvement was noted. Menstruation was abundant, irregular, and painful. After five months menstruation had ceased, and there had been no recurrence of symptoms five months later.

ADRENALIN IN THE PERITONEAL CAVITY.

Marvel (*Therap. Gaz.*, Detroit, 1906, June) advocates the use of adrenalin in the peritoneal cavity to control oozing. When shock and depression exist, adrenalin diluted with normal salt solution into the peritoneal cavity is more effectual than intravenous infusion. It further tends to prevent the formation of adhesions. He uses one drachm of adrenalin to one or two pints of warm normal solution. Marvel refers to an experience of twenty-eight cases.

RECENT INVERSION OF THE UTERUS SUCCESSFULLY TREATED BY DE RIBES' BAG.

Mantel, Paul (*Ann. de gynéc.*, Paris, 1906, May), reports the following case:—P., 26; three children; the last confinement was terminated with forceps, the labour lasting twenty hours. Acute inversion of the uterus occurred during the period of delivery, probably the result of cord traction. The uterus was replaced manually without difficulty. Five days later the condition recurred, and manipulation failed to replace the inverted uterus. De Ribes' bag was then inserted into the vagina, with the result that the inversion completely disappeared. In order to keep the uterus in its normal position, the bag was retained in the vagina for eight days. Mantel thinks that such treatment in recurrent cases of recent inversion is better than plugging the vagina or the use of stem pessaries.

THE UNRELIABILITY OF CURETTAGE FOR RETAINED PLACENTA AFTER ABORTION.

Lepage, G. (*Compt. rend. Soc. d'obstet. de gynéc. et de pediat. de Paris*, vol. viii., No. 5, 1906, May), states in favour of the curette—(1) That it is more easily introduced than the finger; (2) in septic cases, it protects the operator's fingers. Against it, however, are—(1) Danger of perforating the uterus; (2) portions of placental tissue may be left behind. Lepage favours the introduction of the finger into the uterus, on account of the danger of incomplete removal of all the uterine contents with the use of the curette, and he quotes two cases where the uterus was curetted with the view of procuring abortion at the third month, and where the pregnancy was undisturbed, both patients going on to full time. Only by thorough digital examination can one be certain that the uterus is empty.

AN EXPERIENCE OF TWENTY-ONE CASES OF HEBOTOMY.

KAIMEGIESSER (*Arch. f. Gynæk.*, Berlin, Bd. lxxviii. Heft 1) reports on twenty-one cases from Leopold's klinik, illustrated by Röntgen's rays, showing the degrees of separation in the pubic bones. All the mothers recovered, but only seven remained afebrile during the puerperium. Of the twenty-one children, seventeen left hospital well. Of the mothers, eleven were primiparæ, and all had a rickety contracted pelvis with a conjugate of 7 to 8·5 cms. In his last fifteen cases Kaimegiesser has employed the subcutaneous method of dividing the pubic bones, with satisfactory results. The patients were able to walk fourteen days after operation. He regards the operation to be indicated when the conjugate measures 7 to 8½ cms. The operation will not, however, entirely do away with the necessity of perforation, as shown by the statistics of the Dresden klinik. During eighteen months when those hebotomies were performed there were nine cases of perforation of the living child. In the same period there were fifteen cases of induced premature labour. Only nine children survived, all the mothers recovered.

THERAPEUTICS.

UNDER THE CHARGE OF

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ACTION OF SOME DRUGS UPON THE ENDOGENOUS URIC ACID OF GOUTY INDIVIDUALS.

WALKER HALL and J. Randall Hutchinson publish a few observations, in which the output of total nitrogen, total purin, and uric acid was determined in gouty individuals. The drugs tested were ammonium hippurate, citarin, casein, magnesium dioxide, and thyminic acid. The administration of casein was associated with a slight increase of the endogenous uric acid, but the variation is so slight that it remains within the margin of the known variations which occur spontaneously in gout. The magnesium oxides produced no changes, but the ammonium hippurate was followed by an increase in the uric acid output. Thyminic acid produced no increase in the urinary purin nitrogen. These findings show that the drugs tested have no action on the site of the disturbed metabolism in gout.—*Med. Chron.*, Manchester, 1906, June.

CHRONIC BELLADONNA INTOXICATION.

ACUTE atropine poisoning occurs not infrequently from the use of atropine drops in ophthalmic practice, and from the application of belladonna plasters. A chronic intoxication with the alkaloid is almost unknown. Tyrrell reports such a case in the *N.Y. Med. Journ.* of 11th August 1906. His patient had been in failing health for a number of years with tumours, cardiac embarrassment, palpitation, and fast irregular pulse. He had lost weight, and had been under many physicians, who agreed that he had some obscure form of heart disease. When he came under Tyrrell's care he showed a peculiar form of restlessness, characterised by a constant desire for action, associated with lassitude, and at times he showed some mental disturbance with excitement and mild hallucinations. On careful inquiry, it was discovered that for a number of years the patient, who suffered from corneal opacities, had been in the habit of using a solution of atropine sulphate, 4 grs. to the ounce. On stopping the use of this wash, he commenced to improve, but the gain in health was slow and gradual. After three months' treatment there is still weakness and tumour, but the pulse is steady and of fair quality, while the rate has fallen to 90 beats per minute.

ACTION OF GELATIN INJECTIONS IN INFLAMMATORY CONDITIONS OF THE KIDNEY.

CLINICAL reports regarding the value of gelatin injections in renal hæmorrhagic conditions vary very greatly. Some observers have obtained good results; others condemn the injection. By means of animal experiments Lütkens has attempted to determine the action of the drug in acute inflammatory conditions. He induced, in healthy animals, renal irritation by administering aloin, potassium chromate, and the cantharidinate of potassium. Cryoscopic observations of the blood showed that injection of gelatin caused no increase in the molecular contents of the blood, while the coagulation time is almost invariably reduced. The gelatin injection exerted no bad influence in the excretion of the albumin, and as it evidently leads to no sign of renal insufficiency, there seems no reason why the injection should not be tried in acute hæmorrhagic nephritis.—*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1906, July 20.

CLAVIN.

IN the *Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1906, July 20, Vahlen describes the preparation and action of clavin, an active principle which he has isolated from ergot. Clavin is a crystalline substance of definite chemical constitution. It is soluble in water, and represents the part of the drug which acts on the uterus. Animal experiments show that it has but little general action upon the system. It is devoid of any convulsive or vaso-constricting action. The wattles of a cock are not altered in colour by the drug. He shows that the drug injected into a vein produces contractions in the pregnant uterus of rabbits, cats, and dogs. In a limited number of experiments on human beings, he states that clavin injected into the subcutaneous tissue produced powerful contractions of the uterus in cases of deficient uterine action. In a series of twenty cases, in which it was used during the third stages of labour, clavin produced more or less effect, but in some cases the dose had to be repeated. These experiences show that clavin undoubtedly exerts a specific action upon the uterus. Vahlen claims that clavin is a definite substance of known chemical constitution, which exerts very little action on the general system. It is entirely free from any tendency to cause gangrene or convulsions. On the other hand, it exerts a specific action upon the uterus, and induces more or less energetic uterine contractions. This action has been observed both in animals and in human beings.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

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Medical Responsibility in Cases of Death during Administration of Chloriform.

In the June number of the *Ann. d'hyg.*, Paris, of which Brouardel was editor for the long period of twenty-seven years (1879–1906), appears what we regret to think will be the last of those admirable commentaries on medico-legal subjects for which the name of Brouardel is famous throughout the civilised world.

The case which was remitted to him by the Court for an opinion was one of death at the commencement of the administration of chloroform by a doctor for the purpose of more thoroughly examining the shoulder of a patient, named Prévost, which had been dislocated six weeks before. The widow claimed 50,000 francs damages.

With the care and minuteness which was characteristic of him, Brouardel discusses in the most lucid manner the question of medical responsibility in chloroform administration. Into this we do not propose to enter, but as an example of his style, and as a tribute to his memory, we venture to reproduce the following interesting preliminary remarks from his report on the case:—

"*Death occurring during the administration of chloroform is not necessarily attributable to the action of the anæsthetic.*—Long before the discovery of anæsthesia by means of ether, chloroform, and laughing-gas, surgeons experienced cases of sudden, instantaneous, and irremediable death occurring at the moment when they were either about to commence an operation or during its performance.

"Bichat stated: 'There is sometimes a marked disproportion between the sensation of pain experienced and the effect produced on the circulation and respiration. A patient may die suddenly after incision of the prepuce. The operation of treating fistula of the anus by ligature was also the cause of almost instantaneous death in a patient who was operated upon by Desault.'

"Desault, prior to an operation, was once tracing with his finger on the neck, in the presence of his students, the line of the incision he intended to make, when the patient suddenly succumbed.

"In cases of reduction of dislocation of the shoulder, Lisfranc used to warn his students to be on their guard against a possible attack of syncope. He enjoined on them never to undertake such a reduction unless the patient was in the recumbent posture. This advice of Lisfranc was given before 1847, the date of Lisfranc's death, and also before Malgaigne's communication to the Academy of Medicine upon the first cases in which an anæsthetic was used.

"Verneuil scrapes the walls of an abscess of the neck without using an anæsthetic; the patient dies.

"Cazenave (of Bordeaux) puts a patient upon the table to perform lithotomy. At the instant when he introduces a catheter into the urethra in order to make a final exploration, the patient dies. He had not employed any anæsthetic.

"Routier and Legroux are called to a lady suffering from fracture of the thigh. They arrive, and, after introducing themselves to her, they leave in order to prepare the necessary apparatus in an adjoining room. At this moment the patient suddenly expires. If Routier and Legroux had already commenced to give the anæsthetic, death would have been attributed to the chloroform.

"Volkmann (of Berlin), operating on an infant 1 year old for hare-lip, puts in the pins; the child becomes blue and stops breathing; he withdraws the pins, and it becomes quite well again. Some hours afterwards he resumes the operation, which passes without incident. Volkmann remains for a short time with the child, then he returns home; a few seconds after his departure the child is seized with the same symptoms as at the first operation, and when Volkmann arrives at the bedside of his small patient, it is dead. Volkmann had not employed any anæsthetic.

"Simpson accidentally breaks the bottle of chloroform which he is about to use; he cannot therefore employ an anæsthetic. At the moment of making the first cut with the knife, the patient dies suddenly."

Certain persons, therefore, are possessed with a fear of pain, a susceptibility which can of itself without the addition of any other influence lead to death by sudden arrest of the movements of the heart and respiration (Brown Sequard's "Inhibition").

This pusillanimity, this fear of not awaking, has often been noted in persons dying during the administration of chloroform. It seems that Prévost was under this impression, since before becoming unconscious he said to his friend Delorme, who was assisting the surgeon, "You will come to my funeral." Apart from any anæsthetic whatsoever, sudden death can therefore occur before an operation is even commenced as well as during operations of the most trivial nature.

The personal equation of the patient plays an important rôle in the cause of this accident.

Death in these cases, apart from all action of the anæsthetic, occurs from syncope (cardio-pulmonary inhibition), just as death may also take place during the first inhalations of chloroform.

The use of anæsthetics has not, therefore, created a new form of death by arrest of the movements of the heart and lungs. This existed before anæsthetics were discovered.

ON THE EARLY OCCURRENCE OF ADIPOCERE.

VAUGHAN (*Indian Med. Gaz.*, Calcutta, 1906, May) records five cases of alleged formation of adipocere within a few days after death, which he hopes will strengthen the position taken up on this question by medical jurists in India. This is doubtful, unless more scientific descriptions are given of the appearances presented, and also some information is afforded as to the chemical tests upon which so much reliance seems to be placed by the author.

The first case recorded by Vaughan was a European who fell into the Hooghly on 1st January. The body was recovered on the 8th, and upon the following day a post-mortem examination was made. "There was little odour of putrefaction, and the muscular tissues of the thoracic parietes, part of the mesentery, the skin from over the umbilical region, and the meat in the contents of the stomach, the fat and fascia from the supra-pubic region, appeared to me to show traces of saponification."

CASE 2 refers to a woman who was found dead in bed in her house three days after she was last seen alive. Vaughan states, "The pectoral muscle and lungs appeared to me to be distinctly saponified, and portions of them were sent to Major C. H. Bedford, who again confirmed my opinion on chemical analysis."

CASE 3.—On 24th May a man was murdered and left lying in an empty hut in a plantation. On the 29th the author examined the body, and says, "Again noticing that there was remarkably little of a foul odour from a body so long dead, I suspected saponification, and discovered it in the tissues of the thoracic and abdominal parietes and in the lungs and omentum, portions of which I sent for chemical analysis." The result of the chemical analysis was that there was "distinct evidence of partial saponification."

CASE 4.—The author again suspected (*sic*) saponification in the body of a man who met his death in some premises which went on fire. The post-mortem was made seven days after the occurrence: "there appeared to me to be distinct traces of saponification." Portions of the tissues were sent for chemical analysis, and the reply of the chemical examiner was, "that the tissues sent him responded to the most important tests for adipocere."

CASE 5 refers to the body of a fœtus which was found floating in a tank, and which could not have been dead for more than three or four days. "The protruding portion of the brain seemed to me to be adipocerous, and I removed it and sent it, together with other tissues, for analysis." The chemical examiners "both declared that there was no doubt about it; the brain clearly showed all the reactions of adipocere."

The early formation of adipocere is a subject of considerable medico-legal interest and importance, and Coull Mackenzie's recorded cases gave rise to a good deal of discussion and scepticism. We scarcely think Vaughan's paper will tend to remove doubts as to the accuracy of such observations coming from India, and would suggest that future papers on the subject should be accompanied by a careful description of the naked-eye appearances, as also of the tests upon which the chemical diagnosis rests. It might also be advisable that a definition of what is exactly meant by the term "saponification" in such cases should be given.

Mistaken Diagnosis of Human Remains.

The following instance (*Arch. f. Krim. Anthrop.*, Bd. xxiii. Heft 3 and 4) of mistaken identity is of interest, and is on a par with the well-known case recorded by Taylor, in which the fin of a turtle was mistaken for a human hand.

In one of the Prague daily papers a notice appeared stating that in Strzechovitz two human hands, together with the wrist-joints, had been found. The thumbs were absent, and it was suggested that they were preparations which had been thrown away by some one belonging to the medical profession. The remains were sent for examination to the University of Prague, where they were at once pronounced not to be human. This ended the matter so far as the judicial authorities were concerned; but a point of considerable interest is the fact that Professor Dexler of the Veterinary Institute, to whom the parts were afterwards handed over, found it to be by no means an easy matter to determine the species of animal to which they belonged. The skin had been completely removed, with the exception of a small piece attached to the distal extremity of the end phalanx of the right forefinger.

As a result of his examination, Professor Dexler came to the conclusion that the remains were the fore-paws of either a tiger or lion, probably the latter, since inquiries proved that the propiictor of a neighbouring menagerie had recently received two lions, about the disposal of which he gave contradictory accounts. A photograph given of one of the *corpora delicta* serves to explain the ease with which, in the first instance, the mistake in identity occurred.

DERMATOLOGY.

UNDER THE CHARGE OF

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The Pathology and Treatment of Leprosy.

Unna (*Monatsh. f. prakt. Dermat.*, Hamburg, 1906, June 15) remarks that the time must now be regarded as past when leprosy was looked on as an incurable disease. One should not confound the cure with the spontaneous ameliorations which occur in its course, as the result of change of residence or of mere hospital attention. Ehlers and Cahnheim have met with instances of cured leprosy in Crete and Tonkin in the Soudan. Kaposi and Vidal were hopeful, the former observing, "leprosy is till now an almost incurable infectious disease"; the latter, "we have no specific for it, yet we ought not, I think, to despair of finding one." In lepra-free countries the leper is unreasonably considered a pariah, and therefore when under treatment carries out to the letter the injunctions of his doctor, or submits to, nay demands, the employment of any measures, however painful, which offer a chance of cure. Unna in twenty-two years has treated sixty cases, and watched their progress for periods varying from two months to twelve years. The severity varied from slight examples to universal ones, involving the cutis and subcutaneous tissues. As he has viewed the question largely from the cutaneous aspect, his treatment has been essentially dermatological. Though there may be no specially applicable specific as is mercury in syphilis, it must be borne in mind that there are numerous cases, particularly of tertiary syphilis, which do not react to treatment by mercury and iodide alone, yet get quite well when to these energetic external measures are superadded. as by sulphur or cauterisation. There seem to be individual or local hindrances to the action of the drugs alone removed by association, be this an encapsulation of the virus or a mixed infection, or something else. In leprosy something analogous occurs. There are remedies which, according to authors, now and again cure, according to others may induce marked improvement. It behoves us to discover how the good effects can be heightened and the impediments removed. The most important obstacle lies in the torpid and feeble reaction of the cutaneous tissues evoked by the bacillus itself, leading to its fibrous encapsulation. Another consists in the blocking of all lymph canals of the affected tissues by the bacilli, so that no active metabolism goes on, and our remedies reach them but slowly. This leads to the paradoxical statement that lepromata of the cutis are more difficult of cure than those of the subcutaneous tissue. The bacillus, again, develops a firm internal fat, rendering it amenable more readily to oily than watery solutions. If it shares this power with tubercle bacilli, it surpasses the latter in inaccessibility by the production of a sticky investment made of dead and swollen bacilli, gloea intervening between them and the tissues. By a particular method of double staining he has shown that most of the bacilli in the vital tissues, and also most of those excreted, are dead. Since rational treatment must be directed towards getting rid of the solid fat in the bacilli themselves and in the enveloping mucoid masses, heat constitutes one of our most valuable agents. This is best employed as warm baths, which may advantageously contain sulphur, or iron and tannin-ink baths. Another mode of utilising heat is by firm pressure with a hot flat iron. This is especially useful in cases of widely distributed nerve lepromata, as also for individual emboli, characterised by slight reddening and increased local resistance of the skin. Shaving off prominent nodules gets rid of much diseased tissue, and the raw surfaces heal readily. The blocking of lymph channels and vessels with the masses of bacilli largely inhibits the absorption of remedies, and though pressure and massage seem indicated to displace these, there is some danger, if these measures are employed, of scattering them further, and so occasioning embolic nodules out of which new lepromata may develop later. This is all the more likely, since it has been shown that the bacilli are not necessarily enclosed within cells, but lie free in the lymph spaces. Thiosinamin has proved valuable in reducing keloidal growths. Both pyrogallol and pyraloxin are efficient in ointment form. Ichthyol and camphor are applicable as internal remedies, the latter best used subcutaneously in the form of camphorated oil. Oleum gynocardii has had some reputation, but only a few can take it continuously without digestive disturbances. This has been overcome by prescribing it as a gynocardia soap in keratinised pills. To introduce a sufficient dose, however, many pills daily have to be administered, hence enemata of the oil emulsionised with milk has proved an admirable method. The reproach of Lie that such measures do not touch the internal manifestations of leprosy, is combated by Unna, who cites in support of his view the rapid and remarkable improvement in the general condition in cases treated by him. A short account of four of his cases which had been followed up for a considerable time after treatment had been discontinued, a sketch of his mode of procedure, with a series of formulæ, conclude an interesting article.

Bullous Affections and their Classification.

Bronson and Bowen contribute suggestive papers on this topic (*Journ. Cutan. Dis.*, N.Y., 1906, March). Bronson observes that in every skin disease, whether idiopathic or symptomatic, whether a mere anomaly of growth or an inflammatory affection, there is a determining cause inherent in the local pathology. Erythema and inflammatory effusion ordinarily causing diffuse œdematous swelling, do not produce a blister unless something particular transpires. Again, in coccogenic diseases usually resulting in pustules, when the sepsis is exceptionally pronounced or the epidermis easily disorganised, as in young children or infants, blebs in place of small collections of pus appear, and we have a bullous impetigo contagiosa. Similarly, with bullæ as epiphenomena in special types, the effusion, instead of dispersing itself through the lymph spaces in the rete and in the tissues contiguous to the vessels, bursts asunder weakened cell connections and forms a lacuna in the epidermis. The change in the rete which permits this procedure is known as acantholysis. It varies in degree in different cases; less in the bullæ of zoster, where the resisting trabeculæ give rise to multilocular blebs, greater in impetigo bullosa and pemphigus, most marked in pemphigus foliaceus, where the least *vis a tergo* loosens the cohesion of the cells and thus produces flat, flabby, weak, ill-developed bullæ of short duration. While acantholysis is a condition precedent to almost all bullous diseases, it rarely occurs in an entirely independent form unless in the congenital and usually inherited disorder known as epidermolysis bullosa. A fundamental distinction is to be made between bullæ which have a dynamic or mechanical cause and those due to a preliminary deterioration of vitality in the prickle cell layer of the epidermis. The first constitute the obstructive, the latter the acantholytic forms. In the former the cause is an obstruction either in the sweat follicles or lymphatic channels, causing, by simple mechanical force, an accumulation of fluid in the substance of the epidermis. This gives rise to such affections as sudamina, dyshydrosis, and lymphangioma circumscriptum. To the latter, *i.e.*, those in which there is preliminary acantholysis, belong by far the greater number of bullous affections. The source of the injury which gives rise to acantholysis may be—(1) *Extracutaneous.*—From traumatism, extreme change of temperature, or the action on the skin of acrid substances, as cantharides, rhus, etc. (2) *Intracutaneous.*—As an incidental effect seen in erythema multiforme, erysipelas, urticaria, etc. Or from local infection by penetration of micrococci from without. (3) *Infracutaneous.*—From some disorder interior to the skin. This may be from toxic materials deposited in the tissues from the blood, but in most cases we must assume a neuropathic origin. Of these a good illustration is found in dermatitis herpetiformis. The term herpetiform here, however, rather refers to the general form of the lesions, their peculiar mode of occurrence, and their grouping and arrangement, than to the idea of vesiculation. When bullæ appear in its course they may be attributed to any of the three sources of injurious influence tabulated above. Though the scope of pemphigus has been restricted, the chief distinction between it and dermatitis herpetiformis lies in the circumstance that in pemphigus the evidence points to a far more profound derangement of cutaneous vitality as well as to some graver internal disorder. It is not at all improbable that in many instances a slight external injury, chafing or scratching, is the exciting cause of the bulla in pemphigus, as it is in dermatitis herpetiformis bullosa. Indeed, a condition may be acquired analogous to what obtains in congenital epidermolysis bullosa. Still more does this surmise apply to the so-called pemphigus hystericus, where but a single bleb may appear. There is profound functional derangement of the nervous system capable of effecting trophic changes in the skin. The mystery of a single lesion can hardly be explained except by referring it to a local exciting cause, probably some slight traumatism. Bowen notes that the recurrence of the lesions in dermatitis herpetiformis in separate attacks is their most characteristic feature, and without this recurrence he does not believe a positive diagnosis possible. In children the element of multiformity in dermatitis herpetiformis is often wholly lacking, the disease tends to manifest itself in a purely bullous and vesicular form, while the subjective symptoms may be absent or insignificant. In their case, too, the parts about the nose, mouth, and eyes, the backs of the hands and wrists, the back of the ankles and the feet, and the genital organs, are those most prominently attacked.

FIBROMA MOLLUSCUM.

THE origin of this morbid condition has given rise to much discussion, and a case investigated by Vörnor (*Dermat. Ztschr.*, Berlin, 1905, October) is interesting in this direction. The patient was a woman æt. 30, who had characteristic small tumours all over her body. When these were pressed back into the skin a ring formed by the normal cutis became perceptible. A brunette in type, she showed marked alterations in the distribution of pigment, since she was studded over with brown stains, some of which, as a large one encircling the pelvis, were of large dimensions. But there were also spaces, more especially one between the scapulæ and within a darkly pigmented area, quite white, corresponding to leucoderma. A number of small growths were excised, with enough of surrounding skin to permit of comparison. These consisted of roundish tumours which, starting from the upper part of the subcutaneous tissue, extended to the cutis immediately below the papillary layer. Their structure in the main was made up of areolar tissue rich in cells, the individual elements being round and spindle cells with large oval nuclei, concentrically arranged. Very fine and delicate elastic fibres were sparingly discoverable, showing no signs of degeneration and resembling those seen in early embryonic tissue. Nerve fibres entered the tumours and at once became larger in consequence of an increase in the number of the cell elements of the endoneurium. This gave rise to a separation of the bundles of the nerve fibres themselves within the tumour. At its exit, however, the nerve again assumed its normal size, nor did it manifest any alteration of a morbid character. He thinks that this goes to controvert v. Recklinghausen's idea that fibroma molluscum arises from proliferation of the neural areolar tissue (neurofibromatosis), although it realises his view of the proliferation of the endoneurium within the tumour.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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Lumbar Puncture.

Kopitzky, in an interesting paper on lumbar puncture (a method first introduced by Quincke), considers the subject from three distinct points of view—(1) As an aid to diagnosis; (2) as a therapeutic measure; (3) as a procedure to produce anæthesia.

The following are the essential points in the technique of the examination of the cerebro-spinal fluid as an aid to diagnosis:—

(1) *The pressure under which it is obtained.*—According to Quincke, pressure rises in grave inflammatory conditions, in tuberculous meningitis, and in brain tumour. The highest pressures recorded are in cases of hydrocephalus and in tuberculous meningitis. (2) *Coloration.*—The colour varies from clear yellow, or slightly cloudy in cases of tuberculous and chronic meningitis, to well-defined purulent turbidity in cases of acute purulent meningitis. (3) *Bacteriological findings.*—Nearly all forms of micro-organisms have been found in the fluid, the commonest being diplococci, especially in affections of the spinal membranes, Weichselbaum's *Diplococcus intercellularis* in cerebro-spinal meningitis, and the tubercle bacillus in cases of tuberculous meningitis. The latter is not found in all cases, and when discovered the tubercle bacillus is

only present in small numbers. (4) *Cytodiagnosis.*—Lymphocytosis of the spinal fluid is especially observed in chronic meningeal affections. Polynucleosis is a sign of an acute and violent irritation, and is usually found in acute non-tuberculous meningitis. (5) *Chemical examination.*—In ordinary cases the chemical character of the cerebro-spinal fluid is indifferent and devoid of practical value. (6) *Cyroscopy.*—The determination by cyroscopy of the osmotic tension of the cerebro-spinal fluid means the establishment of its coagulating point as compared with that of blood serum.

As a therapeutic measure, speaking broadly, lumbar puncture affords two ways of influencing a given lesion—

(1) By affording a road for the introduction of medicaments into the spinal canal, and from there into the cranial cavity, with the idea of producing a resultant action directly upon the cranial or spinal lesion. (2) As a means of producing favourable therapeutic action by the withdrawal of excessive amounts of fluid, thus relieving pressure and also simultaneously bringing about the removal of the causative foci of the disease.

Many drugs have been employed in the application of the first-named principle, such as iodide of potassium, iodoform, anti-tetanus serum, but the idea of a direct action on the meningeal lesion has not been found generally useful from the practical standpoint. The greatest success has attended the introduction of the anti-tetanus serum. In tuberculous lesions the idea was particularly popular, but the therapeutic success has proved disappointing. To relieve pressure, lumbar puncture has been employed in a great variety of conditions. In tuberculous meningitis it seems to have a sedative and analgesic effect, relieving somnolence and for a time even the coma, while its action in relieving the intensity of the headache has been generally recognised. Other conditions in which it has been found useful are the diminution of the hydrocephalic effusion for which it was originally designed by Quincke, the relief of headaches secondary to syphilis, chlorosis and Bright's disease, in many of which it has proved of excellent service. In uræmia, in brain tumours, in Huntington's chorea and cerebral venous hyperæmia, and lastly in the relief of vertigo, tinnitus, and the dry otitis media, there is no lack of evidence of the occasional good results of this method of treatment.

The dangers of the procedure have probably been exaggerated. That it has caused death cannot be denied, but the danger is lessened by the horizontal posture and by absolutely forbidding the aspiration of the fluid, simply permitting it to come away in a spontaneous flow. The possibility of cerebral hæmorrhage should always be kept in mind, especially when withdrawing large amounts of fluid. Small hæmorrhages represent no danger to life. The paper concludes with a consideration of lumbar puncture as a procedure to produce anæsthesia. The author considers that the enthusiastic endorsement accorded to its introduction is now on the wane, and that by the majority of operators it is now being abandoned and condemned.—*Am. Journ. Med. Sc.*, 1906, April, p. 648.

TETANY.

CAMPBELL HOWARD (*Am. Journ. Med. Sc.*, 1906, February, p. 301) adopts Escherich's two main clinical varieties of tetany—(1) An intermittent form, in which the muscular spasms disappear, and only those latent symptoms associated with laryngospasm are present, *e.g.*, tetany of rickets. (2) A persistent form, in which the persistent contractures predominate, and last for days or even months. The irritability of the nervous system is less pronounced, so that latent symptoms may be entirely absent. The author reviews in tabular form forty-seven reported cases which occurred in America during the last ten years. Frankl-Hochwart's classification is adopted. The disease is more common in winter and spring, especially during the months of March and April, and exposure during these months may determine the outbreak of the latent disease. It is chiefly a disease of infancy and young adult life, and during infancy the male sex is more susceptible. There appears to be in some families a peculiar hereditary liability to the disease. Tetany occurs frequently in children in association with gastro-intestinal disorders, acute infectious diseases, and rickets. In girls it occurs sometimes at the period of puberty, especially when menstruation has been delayed. Kassowitz' and Cassel's belief that tetany and laryngismus stridulus are caused by rickets finds its support in the remarkable coincidence of both diseases, and in the parallelism of symptoms. In the first place, there is evidence of rickets in 66 to 94 per cent. of children suffering from tetany and laryngospasm; secondly, the three affections occur in children between three months and three years; and, lastly, the three affections are all more common during the spring months. Pathologists are not agreed as to the anatomical lesions that occur in tetany, as there are few satisfactory records of post-mortem examinations, and in these few little was to be found. No definite conclusion is arrived at in the pathogenesis of the disease, but the author believes that the theory of intoxication is that best supported by the available facts. The intoxication may be exogenous as in the epidemic variety, which in many ways resembles an infectious disease, but this variety of intoxication can at best account only for a small number of cases. It is rather from the autogenous intoxication theory that we can expect most. There are two organs which have been suggested as the site of the origin of the toxin, namely, the stomach and the thyroid gland. Several substances have been isolated from the gastric contents which are said to be capable of producing the symptoms of tetany when injected into animals, but there is not yet sufficient evidence to allow us to accept this as a proven fact, and the supporters of the autogenous theory advance a disordered thyroid metabolism for consideration. Tetany has repeatedly been produced by removal of the thyroid gland. It is thought, however, that tetany, following the extirpation of the thyroid in dogs, is not due to the loss of the thyroid function, but to the coincident removal of the para-thyroid glands. When these glands are removed, a poison, which was formally neutralised by them, acts upon the central nervous system, and produces tetany. Prodromata, such as numbness, tingling, and formication, frequently usher in the attack. Vomiting was the precursor of the paroxysm in fourteen cases. The spasms have certain definite features. They are bilateral and tonic in character, usually commence at the periphery, spreading upwards until the entire musculature of the body may be involved. All four extremities, or only one, may be attacked. In the author's series both arms and legs were involved in sixty-one cases, the arms alone in fourteen, and the legs alone in two cases. Occasionally spasm occurs in the muscles of the face, resulting in the risus sardonicus. Still more rare is the involvement of muscles of mastication, though that this does occasionally occur in tetany, as in tetanus, must not be forgotten, as it was present in ten of the author's cases. The muscles of the back, producing opisthotonos, were involved in twenty-four cases, the thoracic and abdominal muscles in nine cases, and the diaphragm in three severe cases. In a few isolated cases the bladder has been attacked. While the spasm is usually tonic in character, it may be clonic at the outset, and in some cases, from this fact, may be mistaken for epilepsy. Laryngospasm in the great majority of cases is associated with tetany, but other cases form a special group independent of this condition. Trousseau's phenomenon was present in 80 per cent. of the cases. It is the first accessory symptom to disappear. Chvostek's symptom occurred in 50 per cent. It can be produced by pressure over the seventh nerve, either at its exit from the stylo-mastoid foramen, or along its extra cranial course. The mouth phenomenon described by Escherich consists in a contraction of the orbicularis oris on tapping the corner of the mouth or upper lip of the opposite side. Erb's phenomenon implies increased electric irritability of the motor nerves or muscles to both the faradic and galvanic current. It is a most constant phenomenon, and may be demonstrated for weeks after disappearance of all spasm. There is pain during the spasm in severe cases, sometimes of great intensity. Pain was present in over 90 per cent. of the cases where the symptom was investigated. The tendon reflexes are variable, being sometimes increased and at other times diminished. Solid œdema of the hands and feet may develop, and either disappear during the paroxysm or persist in the intervals. Occasionally effusion takes place into the tendon sheaths or joints. The pulse is often accelerated, the temperature raised, and there may be either rapid breathing or dyspnœa. There is frequently diminution, sometimes suppression, of urine, and the presence of albumin is frequently noted during the paroxysm. The prognosis is usually good. The chief danger occurs when the paroxysms are very violent, causing considerable interference of respiration, with signs of œdema of the lungs. In children with chronic diarrhœa the mortality is high. Tetany, following acute infection, exposure to cold, exhaustion, rickets, and the administration of toxic substances, generally runs a mild course. In the epidemic variety the prognosis is very favourable.

ANALYTICAL REPORTS.

Hommel's Hæmatogen.

(Nicolay & Co., 36 and 38 St. Andrew's Hill, London.)

Among the numerous preparations of iron which are on the market, Hommel's hæmatogen has gained a fair share of favour from the profession, and has now apparently established a reputation in the treatment of conditions in which iron is indicated. It is an excellent preparation of hæmoglobin, and there is every reason to suppose that it increases the iron in the blood where deficient, while it is at the same time devoid of the astringency of the inorganic salts. We have received samples of hæmatogen, differing from that formerly supplied in containing no alcohol. The preparation before us contains 80 per cent. of concentrated and purified hæmoglobin, 20 per cent. of pure glycerin, and a trace of aromatic flavouring. Its taste is not unpleasant, and it may be given mixed with plain or aerated water or light wine. Its freedom from astringency renders it suitable for children. The new hæmatogen is superior to the old in being destitute of alcohol; it may be prescribed with confidence where a genuine preparation of hæmoglobin is wished.

"Tabloid" Laxative Fruit Pastilles, Menthol Pastilles, and Menthol and Eucalyptus Pastilles.

(Burroughs, Wellcome, & Co.)

These pastilles, of which the makers have submitted samples to us, present a most attractive appearance. The menthol, and menthol and eucalyptus, pastilles have a more agreeable taste than any others of similar composition we have met with; yet the active ingredients are present in sufficient amount to render them efficacious in irritable and ulcerative conditions of the throat, while, as they dissolve slowly in the mouth, a reasonably prolonged action can be obtained.

The laxative fruit pastilles have, as their active ingredient, extract of senna, of which each contains 5 grs. The taste of the drug is so completely disguised, that the most experienced infant will fail to detect the powder in the jam. They are mild laxatives; and as senna is a drug which is excreted in the milk, they may be used for the sake of their indirect action on nursing infants.

Tabloid Ferric Chloride and Arsenic.

(Burroughs, Wellcome, & Co.)

Each of these tabloids represents tincture of ferric chloride, 10 minims and $\frac{1}{50}$ gr. of arsenious acid, and they form a very convenient method of giving this valuable combination in anæmic conditions. The arsenic increases the number of the red cells, while the iron increases chiefly the amount of hæmoglobin in these corpuscles. The tabloids are best given dissolved in a large wineglassful of water after food.

Oxygen Baths.

(The Roborat Co., 27a St. Mary-at-Hill, London, E.C.)

The Nauheim treatment of diseases of the heart and of the nervous system, by immersing the patient in a bath in which the water is impregnated with carbonic acid gas, is too well known to require special notice. The therapeutic value of these baths probably depends on the mechanical stimulation of the skin by the innumerable gas bubbles which adhere to it, and not to the chemical nature of the gas used. There is therefore no special advantage in using carbonic acid when an artificial Nauheim bath is used, and indeed the substitution of oxygen is in some cases a positive advantage, as, for instance, in cases of cyanotic heart disease, where the use of carbonic acid gas would probably be dangerous. For the preparation of an oxygen bath two tablets are used: the one contains sodium perborate, the oxygenator; the other, manganese peroxide, the catalysator. These two substances have no harmful action on the skin, or injurious effect upon the bath. The evolution of oxygen proceeds steadily during the immersion of the patient, and, if desired, the treatment may be amplified by the use of pine extract, sulphur, etc.

Liquor Colchicinæ Salicylatis (Hopkinson).

(Baiss Brothers & Stevenson, London.)

This preparation has now been in use for a considerable time, and our experience of its use in a number of cases of lumbago, muscular rheumatism, and allied conditions, enables us to state that salicylate of colchicine is a remedy of proved value for such cases. In this preparation each fluid drachm contains $\frac{1}{32}$ gr. of the compound, which, it is to be noted, is not a mechanical mixture of salicylic acid with the alkaloid, but a definite chemical compound. It should also be noted that one does not get equally good results with colchicum wine and salicylic acid. Another satisfactory feature of this remedy is that there are no depressing after-effects, and that the action of the liver and kidneys is in no way interfered with.

Andouard's Beef Powder.

(E. J. Reid & Co., London.)

This food, though little known in this country, is held in high repute in France. It is described as a therapeutic food, and as differing from all other extracts of meat, which are mostly concentrated meat broth and contain only the soluble principles of muscle—that is to say, the least nourishing. This beef powder represents the finest beef deprived of its 80 per cent. of water, and reduced to powder by a special process. Analysis fully bears out this statement, and shows that the powder contains as much as 80 per cent. of albuminous matter, 8 per cent. of fatty matter, and 4 per cent. of salts. It is a grey powder, with a neutral odour and agreeable taste. It is readily absorbed by the weakest digestion, and may be given in warm broth, water, milk, tea, etc., according to taste. Such a valuable food only requires to be known in this country to meet with the same favourable reception that has been accorded to it in France.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

The Cost of Scottish Asylums.

The speech of Lord Rosebery at the opening of Bangour Asylum—the District Asylum of the Edinburgh City Parish—has called forth considerable comment and criticism, favourable and the reverse, both in the community and in the press. The speech has set people a-thinking, and is likely to bear fruit in the immediate future. To this criticism and comment medical practitioners, whether as ratepayers or in their professional capacity, cannot be indifferent, even if they have little share in the shaping and guiding of asylum administration. In this connection it must be borne in mind that but for the two certificates of the general practitioner and the Sheriff's warrant of committal there would be no insane, and no need for asylums. Bangour Village Asylum for the insane poor of Edinburgh city is the latest asylum on the segregate plan introduced into this country by the late Sir John Sibbald, who rightly claimed that it was best for the insane, and economical for the taxpayers, when compared with the pavilion or congregate asylum of former days. The asylum, it is said, will cost £300,000, when accommodation is provided for the 1000 patients contemplated. Not a few shake their heads at the total, bringing out an average of £300 per bed, and declare that this sum will be greatly exceeded. Some years ago the estimates were vastly higher, but the General Board of Lunacy cut them down. Lord Rosebery thinks the cost still too high, and in this view he is in agreement with the majority of medical men as well as ratepayers, who find little comfort in the statement that £300 a bed is a much lower figure than that for the recent Glasgow asylums of Gartloch and Hawkhead (Govan), where the cost per bed is put at £500 to £600, a figure without parallel in the construction of asylums in France or Germany, or in the much richer country of the United States. For the proper care, comfort, and treatment of the insane poor, it may well be asked, Is such an expenditure called for? Like that given by Lord Rosebery, the answer must unhesitatingly be in the negative. His Lordship's speech was full of suggestive considerations, and should bear fruit for all time to come. The full fruition stage will be reached when the asylum authority erects the next at a cost not exceeding £200 a bed. It can be done and should be done, if the matter is gone about in the right way. In the country, land sites are falling in value, and three-quarters of an acre per man need not be objected to. But the cost of asylums lies not there. Rather it is in the palatial masonry, the towers, the domes, the carving and sculpture work, the elegant byres and piggeries, the extravagant internal decorations of the villas, the administrative blocks, the recreation rooms, the parquetry floors, the bathrooms with their Ruffords' porcelain and tinted tiles, such as are not to be seen in any medical man's house, or indeed in the houses of people more affluent. It is appropriate here to reproduce some of the salient and pregnant observations which fell from the Lord Lieutenant at the opening of Bangour. Many of these have caused a flutter in some asylum dovecots, in which the least intrusion or criticism by outsiders is resented as a kind of interference with the alienist and his mystic art, for, whatever it may become in the near future with investigators at work on scientific lines, it is little more than that in this year of grace. His Lordship had a special reminder from the man at his elbow in the committee-room, to put in a plea for preventive asylums for incipient insanity, a very proper reminder. Regarding these, he said, "I trust, if such an asylum is projected, it will be carried out on a comparatively limited and tentative scale, because till we are sure of the results of preventive treatment, we are not justified in adding to the enormous expenditure on lunacy which is at present prevailing in this country." A very proper reply, it will be admitted, to a very proper reminder. He showed that asylum construction in England had cost *twenty-four and a half millions*, and the annual expenditure on maintenance and upkeep was nearly *three and a half millions.* These are fabulous figures. In Scotland asylums have cost approximately for construction *four and a half millions*, and the maintenance bill is £450,000. And he adds, all this "for those who represent sheer waste and decay," for whom "we are building these sepulchres of living humanity, these tombs of the intellectually dead." This metaphor has given offence in some quarters. Why it should, it is difficult to see, for the *majority* of asylum residents—dements, epileptics, congenital imbeciles, chronic maniacs, melancholics, and delusionals—are in this unfortunate category, and their proper treatment and comfort could be achieved in institutions erected at half the cost. What is really wanted for treatment, and what is actually given, is a comfortable bed, good food, good nursing and attendance, exercise or rest as the case may be, and recreation. It is calculated that recoveries in asylums do not exceed 30 per cent., if recurrences of the disease and return to the asylum within the first twelve months are kept in view. This may be a sad reflection, but it is nevertheless a true one. Sapient, suggestive, and significant were the closing utterances of a remarkable speech. "We have to teach the people of this country that their homes are better worth cultivating and inhabiting than any strange places they may care to visit under sweltering and uncomfortable conditions and at great expense." . . . "The one prevailing thought in my mind, which will continue while the impression is fresh in my memory, is, why do all this for the intellectually dead? How much better it would be if we could do it for the intellectually living. . . . How few of the artisan classes can ever hope to have houses so sumptuous and so comfortable as those that you have made here. . . . The full flower and blossom of municipal work will not have been reached until you have attempted at least to make a provision of living accommodation for the living and the worthy workmen; for those who do deserve, the comforts which you have extended to the 'intellectually ill.'" Amen may be said to every word of this. It is difficult to see where exception can be taken to these truths. Indeed, it is to be hoped they have sunk into the public mind and will bear fruit. By all means provide all that is possible for acute and recurring insanity among the poor: make your hospital wards and day-rooms as comfortable and as pleasing and attractive as money and skill can procure, but who shall say that £300, £400, or £500 is required? And if that be so, what is to be thought of such sums spent on the hopelessly intellectually dead who cannot appreciate them? A distinguished French alienist, Dr. Ed. Toulouse of Paris, and editor of the *Revue de psychiatrie*, after visiting our Scottish asylums for the insane poor, left with the reflections, afterwards recorded,—*first*, that he never saw anything like the magnificence of them in any other country; and, *second*, that a feeling of discontent would arise in the minds of the people who passed through them either cured or fit to be treated in their own homes. No reasonable ratepayer will grudge all that is necessary for the housing, care, comfort, and treatment of the insane. What is contended for is, and there is no gainsaying it, that instead of £300, £400, £500 per bed, £200 would amply suffice. The expense is not in maintenance, amounting to £26 per annum. Indeed, it would be difficult to show how the annual bill of maintenance could be less. The expense and extravagance is not there, nor in the wage bill of the nurses and attendants, but in the palatial buildings and equipment which has added so vastly to the indebtedness of localities as to make two successive Chancellors of the Exchequer, Sir Michael Hicks Beach and Mr. Austen Chamberlain, remark that these local burdens were a greater menace to national finance than the National Debt. The mention of the wage bill of asylums suggests that something should be done if there is money to spare, and there is much if the building cost was lessened to the extent indicated, to raise the minimum and maximum wages of the bulk of asylum workers, namely, the attendants and nurses. At present it is a miserable pittance, especially for the females. For male attendants it is about £30, rising to £38, with board and lodging, and for female £16 to £24. Is it to be wondered that with such allowances there is restlessness and dissatisfaction among attendants, which finds some expression in 50 per cent. giving up their situations and going into other walks of life? It is no exaggeration to say that asylum nurses and attendants are engaged in the most trying kind of work in which human beings can be engaged, and that being so, it is only fair that they should be adequately remunerated, and also pensioned, and this could have been done if the money put in the mortar tub was pooled for these two purposes. To remedy an unsatisfactory state of affairs, various suggestions have from time to time been put forward. One may be noted, the proposal to give Parish Councils a share in asylum management. At present, Parish Councils simply find the patients, and pay the annual bill of maintenance. They have no say in the construction and management of asylums, that being vested solely in the Asylum Board, which in the case of Glasgow, Govan, Edinburgh, Dundee, and Aberdeen, is virtually the Parish Council; but in all other district asylums it is vested in a Board elected by the County Councils and Borough Councils, who assess for the erection, equipment, extension, and upkeep of asylum buildings. It is to be hoped that Lord Rosebery's remarks will not be forgotten until a remedy is found for the evils complained of in regard to asylums, and also until the houses of so large a proportion of the ratepayers who contribute to the erection of such places are made what Lord Rosebery desiderates, as bright, as sanitary, and as comfortable as they ought to be, in a land in which wealth, charity, and public enterprise are so conspicuous.

The Edinburgh Parish Council and Dr. Keay are to be congratulated on securing Lord Rosebery to open Bangour, the latest villa asylum. No doubt, as Lord Lieutenant of Linlithgowshire, he was brought to bless the structure and its chief authors. The blessing, a mingled one, will be accepted in a right and chastened spirit by those more immediately concerned with Bangour, as it most certainly will be by a wider public.

Joint Courses of Lectures.

The practice of giving joint courses of lectures, hitherto confined to clinical teaching in the Infirmary, has this year been introduced into one of the systematic courses in the extra-mural school, three lecturers having entered into an alliance to give a joint course of lectures on Medicine. The advantages of such an undertaking are obvious: the student receives the attention of three men instead of one, and an element of change and variety is introduced which will tend to relieve the monotony of his six months' course of lectures. From the teachers' point of view, each of them will undertake those departments of the subject which he has made the subject of special study; he will have more energy and time to devote to that part of the course which falls to his share, and when called out of town or incapacitated by illness, he will have the rare satisfaction of knowing that the class will not suffer by his absence.

Doubtless it will be found that there are disadvantages. It may be urged that, with the almost inevitable increase in the size of the class, there will be a diminution of that personal contact between the teacher and student which is such an important element in the training of a medical man, and there may be a risk of each lecturer so specialising on his own subject, that departments of the course, which have not specially interested any one of the three lecturers, will be scamped or omitted. It will also be urged that the evils which attend upon all combines or trusts may not be wanting. So formidable a triumvirate as we have here in mind will be apt to crush out a lecturer who runs a class by himself, and especially one who embarks upon the troubled waters of systematic teaching for the first time.

The Teaching of Surgery.

It would be idle to deny the existence of an impression that the training in Surgery in a large medical school is less successful than that afforded in other branches of the healing art.

Our local contemporary has concerned itself with the subject in a recent issue, and has published a series of articles thereupon, embodying the views of some of our prominent surgeons.

We should like to express our agreement with those who believe that the student should not begin his surgical training until he has passed the examinations in Anatomy, Physiology, and Pathology, that is to say, those subjects upon which the science and art of Surgery are founded. That even an attempt should be made to tell the undergraduate about, let us say, a strangulated hernia, who has not even dissected the inguinal canal, is obviously absurd, and yet this and similar hopeless efforts are of daily occurrence in hospital practice. It is only reasonable to expect that this undesirable succession of subjects in the medical curriculum will be rectified in the immediate future.

There are other difficulties, however, which will not be so easily overcome. A subject in which the hands as well as the eyes are to be trained is not easily taught to the large number of students who are attracted to a great medical school. Clinical Surgery presents greater difficulties in this respect than Clinical Medicine; the lesions of the heart, of the lungs, of the nervous system, the prescription of medicines, and other branches of purely medical study, are easily brought home to a large succession of men: it is otherwise with the handling of an abscess, a fracture, or the details of an operation. The obvious remedy lies in smaller classes. We know of hospitals where each surgeon limits himself to five dressers, but in a large medical school this number may be multiplied at least ten times.

There is another aspect of the subject to which reference may be made. Should not an attempt be made to differentiate between the training in Surgery which is required for general practice, and that which should be given, subsequent to graduation, to those who intend to specialise in Surgery? An undergraduate, for example, should not be expected to follow all the intricate details of Operative Surgery in which the surgeon is necessarily interested. Apart from emergencies in outlying and sparsely inhabited districts, these will not come within the sphere of the general practitioner, and the time he may spend upon them as an undergraduate would have been better employed in other directions.

It might be reasonably advanced that the surgeon of greatest reputation in any school, whose wards are full of interesting cerebral and abdominal cases, is not so useful a teacher of students as he who has the material for demonstrating to his class the surgical affections of everyday practice.

There is something dramatic about a serious operation which appeals to the student, and our operating theatres are planned so as to accommodate a large body of men. It would be more useful if the student spent more time in the wards and in the out-patient and casualty departments of the hospital.

Balfour of Khartoum.

THE British nation is justly proud of what, in the short space of twenty years, they have accomplished in Egypt. Friends and foes alike acknowledge the great work and the master mind which has produced order out of chaos, prosperity and affluence from a state of bankruptcy, and which has given to a land, only recently steeped in ignorance and fanaticism, educational advantages and scientific institutions not far behind those of European countries.

When, however, the lapse of some years will have enabled the history of modern Egypt to be written, with due regard to perspective, we believe that nothing will stand out more prominently than the rapidity with which that vast torrid expanse known as the Anglo-Egyptian Sudan has been brought from a condition of barbarism to the heel of order and progressive civilisation.

And when this history comes to be written, not the least wonderful chapter which it will contain will be that which tells how, almost simultaneously with the sheathing of Kitchener's sword, there arose phœnix-like from the ashes of Khartoum an institution which has exerted, and, we believe, is destined to have in the future a far-reaching influence in the cause of civilisation and economic prosperity.

The second report of the Wellcome Research Laboratories of Khartoum is before us, and those who read it must acknowledge that it is worthy of a high place amongst the scientific publications of the year, and fully maintains the reputation which Dr. Balfour has already acquired. Those who are acquainted with the first report must have wondered how Dr. Balfour, during his first short year of office, found time, practically single-handed, to accomplish so much, but they will not be less astonished at the contents of the second volume. No doubt he has now brought to his side a few able assistants, but this also, we venture to affirm, is to be attributed as much to his personality and influence as to the generous liberality of Mr. Wellcome and the support of the Egyptian Government.

The staff is now one of respectable proportions, although we fully realise that it is all too small for the immense field of work which envelopes it. In addition to the director, Dr. Balfour, there is a chemist, a travelling pathologist and naturalist, an economic entomologist, and two laboratory assistants, while Mr. Theobald as consulting entomologist, and Mr. Austen of the British Museum, have each given valuable aid.

The work accomplished has been of the most varied character, from that of the mosquito brigade in Khartoum itself on the one hand, to the results obtained from an expedition sent some thousands of miles into practically unknown regions in search of blood parasites of man and animals, and the chemical investigation into the composition of the Nile waters, Sudan grains, gums, and other economic products, on the other hand.

In a most interesting account of mosquito work by Dr. Balfour, he discusses very fully the whole question of the causes and prevention of malaria so far as it affects Khartoum.

We do not doubt that many of his views, together with the practical lessons he inculcates, will be found of the greatest benefit to all engaged in this work. No greater testimonial to the value of the discoveries which have been made in regard to that once dreaded scourge malaria, could be adduced than the following sentence of the report: "Therefore, for something under £100 per annum, Khartoum is kept practically free from malaria, and the inhabitants are secured to a very great extent from the persistent and annoying attentions of those winged pests, which, as a rule, add so much discomfort to life in the tropics."

It is impossible to refer in detail to the scientific discoveries of the fruitful year with which the report deals. It may be mentioned, however, that Dr. Neave, the travelling pathologist, was able from his investigations to negative the existence of *Glossina palpalis* on the Upper White Nile, and thus to allay the fear of the spread of the sleeping sickness from Uganda to the Sudan. He also discovered new trypanosomes in fish and birds, besides other blood parasites, and several new mosquitoes. Mr. Austen reports upon some blood-sucking diptera of the Sudan, and gives descriptions of new species; while Mr. Theobald describes new genera and species of the mosquitoes or Culicidæ, and also reports on human, animal, and vegetable pests. One of the methods by which information was obtained throws a striking light upon the beneficial results of British rule. A simple series of questions was adopted and distributed to the Governors of Provinces and Mamurs all over the Sudan. The questions related to the presence of any biting flies in their district, the time of year they are most prevalent, whether the bites produce any ill effects, breeding habits, etc., and a request was made that specimens should be sent to the laboratories. This memorandum, Dr. Balfour states, was productive of good results, and sometimes of amusing but not uninstructive replies, such as the following: "What I am looking for is a species of fly which does not bite. Could I obtain a male and female of such a species I would start immediate breeding operations."

What a change in government and administration this scheme betokens, and how great must have been the influences at work which has rendered it possible for native officials in the most distant provinces of a country, the geography of which is practically unknown, to be laid under tribute to supply their quota towards scientific research!

Balfour gives a full account of the Hæmogregarine discovered by and named after himself, besides other papers of great scientific interest.

The chemical work accomplished by Dr. William Beam is by no means the least important or interesting portion of this fascinating volume. He tells us of the Nile waters, of the lime and limestones, of arrow poison, of "gum arabic," of Sudan grains, of the Khartoum milk supply; and with reference to the latter he shows how quickly European methods are adopted by the native. Attention had been called to the poor quality of the milk supplied to the Civil Hospital at Khartoum, and examination showed that it contained 25 per cent. of added water. Once started, Dr. Beam says, on this apparently royal road to fortune, the native milk-seller could see no reason for moderation in his pace, with the result that, shortly afterwards, the milk supplied to the Grand Hotel was found to contain 75 per cent. of added water! The native, when accused of carrying her worship of the Nile to undue lengths, naïvely replied, "Malum, I make more money like that!"

We have indicated some of the contents of this volume, of which the Sudan may well be proud, both on account of its record of work accomplished and of the marvellous beauty of its illustrations. One of the latter depicts a haboub or dust storm sweeping over Khartoum north, and more vividly than any words could depict gives an idea of the difficulties which scientific work in the Sudan has to contend against. Dust storms are unfortunately not the only adversaries encountered: there is the overpowering heat, the winds, and in the chemical laboratory the continual failure of the gas and water supply was at first a constant source of vexation and of labour lost.

No complaints are, however, made, and it is typical of the spirit which imbues the director and his staff in their great work, that such climatic troubles are regarded with equanimity.

The Operative Treatment of Goitre.

THE publication by Kocher of a third thousand operations for goitre performed in his clinique affords an interesting object-lesson in surgical therapeutics. That there were only seven deaths in the thousand cases—and three were in cases of malignant goitre, and one in Graves' disease—is a brilliant testimony to the perfection of the technique of modern surgery. Inasmuch as the chief danger in operations for innocent goitre arises from insufficiency in the action of the heart, a great responsibility rests with the physician who allows a patient to develop heart weakness before the question of operative interference has been raised, and a still greater responsibility if he contributes to the development of cardiac insufficiency by the prolonged administration of preparations of iodine or of thyroid extract, the latter in Kocher's experience having done more harm than good. In considering the question of operation in relation to Graves' disease, the risk to life would appear to depend directly on the degree to which the cardiac mechanism has suffered damage, and the only way to eliminate this is by undertaking the operation at an early stage of the disease; it is unfortunately a widespread fallacy that the operation is of the nature of a *dernier ressort*. Another point of general interest concerns the giving or withholding of a general anæsthetic in operations for goitre. Kocher is strongly against general anæsthesia, because, apart from the danger of lowering the blood pressure in cases where there is insufficiency of the heart, it diminishes the certainty of preserving the recurrent nerve, and it introduces the risk of infection, because vomiting may soil the dressings, and thus lead to contamination of the wound. Other surgeons, and we may include Charles Mayo among them, give ether freely by the open drop-method, preceded twenty minutes before by a hypodermic injection of morphine and atropine. In a long experience, this surgeon has never observed any undesirable result which could be traced to the anæsthetic. If it is our desire that goitrous patients should subject themselves to surgical interference at an early stage of the disease, it would certainly be an encouragement to them if we could promise not only a safe but a painless operation.

On 16th October, Professor Noël Paton was entertained to a farewell dinner in the Hall of the Royal College of Physicians. Sir John Batty Tuke, M.P., was in the chair; and the presence of about seventy representatives of the professions of law, science, and medicine testified to the esteem in which the new occupant of the Chair of Physiology in Glasgow University is held by all with whom he has come into contact during a career of great activity and usefulness in this city.

The Royal Medical Society commenced the 170th session of its existence on 26th October, with an address by one of its former Presidents and a distinguished graduate of Edinburgh University —Sir Dyce Duckworth. It must be a source of great gratification to the past members of this ancient Society, scattered throughout the world, to know that time has made no inroads upon its vigour or its popularity amongst the students and younger graduates of the University. It may be that there are still some who do not realise the heritage which has come down to them, but there must be very few who, once having enjoyed the privileges of membership, are not prepared to acknowledge the inestimable benefits which it confers in preparing them for their future careers.

ORIGINAL COMMUNICATIONS.

DISPLACEMENTS OF THE STOMACH, AND THEIR EFFECTS UPON DIGESTION.

By W. SOLTAU FENWICK, M.D., *London*.

ANATOMICAL CONSIDERATIONS.—The stomach is situated in the upper part of the abdominal cavity and to the left side. Above it are the diaphragm and the liver; below it is the transverse colon. In the healthy adult its extreme length is about twelve inches and its width about four and a half inches. The cardiac orifice is situated one inch below the diaphragm on a level with the ninth dorsal spine, and corresponds in front to the seventh left costal cartilage one inch distant from the sternum. The pylorus lies at a lower level, and is nearer the surface. Posteriorly it is on a level with the twelfth dorsal spine, while in front its position may be designated by the point of intersection of a line connecting the bony ends of the seventh ribs with one drawn parallel to and midway between the median line of the sternum and the right border of that bone. The fundus reaches as high as the sixth chondro-sternal articulation on the left side, being a little above and behind the apex of the heart. The lesser curvature runs obliquely downwards and to the right under cover of the liver, and corresponds posteriorly to the upper border of the first lumbar vertebra. The lower border is extremely variable in position, but when the stomach is empty it may be denoted roughly by a line drawn across the abdomen between the bony extremities of the eighth ribs. The cardiac orifice is the most fixed part of the organ, being maintained in position by the œsophagus and the gastro-phrenic ligament. In addition to these attachments, the stomach is suspended from the liver by the gastro-hepatic omentum, and is securely fixed on the left side by the folds of peritoneum which connect it with the spleen. Below, it rests upon a cushion of intestines, and is supported in front by the liver and abdominal wall. The pylorus is the most movable part of the viscus, and has no special ligament, so that when displaced downwards it is chiefly held in check by the second portion of the duodenum, which is firmly adherent to the posterior abdominal wall.

The stomach may undergo displacement upwards, laterally, or downwards.

I. UPWARD DISPLACEMENT.—This can only occur on the left side, since on the other the firm and fixed liver is interposed between the organ and the diaphragm. It is met with in all conditions that tend to shorten the vertical diameter of the thorax, and is therefore a common result of the atelectasis that ensues from a left pleuritic effusion or empyema, and of chronic interstitial inflammation of the left lung. Large ovarian tumours, uterine fibroids, hydronephrosis on the left side, meteorismus, and ascites all tend to push the stomach into the left concavity of the diaphragm, and the same condition ensues during the later months of pregnancy. An important predisposing cause of this form of displacement is to be found in that maldevelopment of the thorax which gives rise to an abnormally narrow costal arch. In cases of this description, the pressure exercised by corsets or tight clothes tends to force the lower four or five ribs inwards, and to depress the line of the waist until it may reach the level of the iliac crests, while at the same time the colon, stomach, and liver are pushed upwards. The effect upon the stomach of upward dislocation varies in different cases, in some the total capacity of the organ being reduced, while in others the pyloric portion becomes diminished in size and the fundus dilated. Occasionally the cardiac region is pushed upwards so forcibly that the lower end of the œsophagus is bent to the left, and the lumen of the fundus greatly reduced. In rare instances the whole or greater portion of the stomach gains an entrance to the left pleura through a rupture of the left wing of the diaphragm, and the upper and left parts of the abdominal cavity are entirely occupied by intestines.

Symptoms.—Upward displacement of the stomach is rarely accompanied by special symptoms unless the degree of dislocation is considerable. In most instances discomfort and fulness are experienced after meals, attended perhaps by nausea, flatulence, and palpitation. In more pronounced cases the torsion of the œsophagus and compression of the fundus prevent eructation of gas and vomiting, so that the feeling of oppression after food is greatly exaggerated, and the patient is unable to assume a recumbent posture without experiencing an alarming sense of suffocation. Upward displacement of a distended fundus is apt to induce paroxysmal attacks of dyspnœa and palpitation during the period of gastric digestion, accompanied by giddiness, cyanosis, præcordial pain, and great irregularity of the pulse. These symptoms are always most severe after the evening meal, and in cases of weak or diseased heart are apt to occasion severe or even fatal syncope. When the displacement arises from narrowing of the thorax and the creation of a low and long waist, the hepatic and splenic flexures of the colon are forced inwards and backwards, and the transverse portion of the bowel is not infrequently bent into the form of a V with the apex pointing towards and reaching within a few inches of the pubes. These changes in the position of the colon are productive of muscular insufficiency, and encourage stagnation and fermentation of its contents, which in their turn may lead to chronic colitis.

Physical signs.—Artificial inflation of the stomach shows that the fundus reaches an abnormally high level in the chest, and causes displacement of the apex of the heart to the right. Splashing sounds are obtained with difficulty, and the great curvature may lie so much above its usual position as to give an impression that the stomach is unduly small.

Treatment.—Care must be taken to correct as far as possible the conditions which are responsible for the abnormal position of the stomach. In the case of abdominal tumours or ascites, the removal of the growth or the fluid is at once followed by a descent of the organ, while in cases of meteorismus the exhibition of suitable aperients, the prohibition of green vegetables and fruit and a course of intestinal antiseptics, are usually followed by immediate improvement. When the distension results from chronic intestinal obstruction, the patient should be given a dose of castor-oil each morning before breakfast, pending the performance of an operation. In those cases where the malposition depends upon an abnormal shape of the thorax, the wearing of tight corsets and of strings round the waist should be avoided as far as possible, and the patient should be taught some form of breathing exercise that helps to augment the capacity of the chest. Gymnastic exercises which promote the muscular development of the chest and trunk are also of benefit.

Starch and sugars should only be allowed in moderation, and care should be taken to avoid any excess of fluid with the meals. Effervescent drinks are almost always harmful. Green vegetables should be taken sparingly, and the food must be carefully and thoroughly masticated. A dose of cascara, combined with euonymin and rhubarb, forms an excellent corrective of the constipation, but salines should be given with caution. When much respiratory or cardiac distress is experienced after meals, a carminative and antispasmodic mixture should be prescribed; and, in the case of severe attacks, the patient should pass a soft tube into the stomach with the view of evacuating the gas which cannot escape through the displaced œsophagus. Intestinal fermentation may be corrected by means of cyllin, guaiacol, or salicylate of bismuth taken after meals.

II. VERTICAL DISPLACEMENT.—In this variety the cardiac orifice and the fundus retain their normal position, but the lesser curvature and pylorus are displaced downwards and inwards so that the long axis of the organ tends to become parallel to the spine. Three anatomical forms have been described—the *angular*, the *fish-hook*, and the *straight*.

(*a*) In the *angular* form, which is by far the most common (Fig. 1), the pylorus is displaced downwards, and is usually situated in the median line of the abdomen just above the umbilicus. The lower half of the lesser curvature runs transversely across the abdomen below the inferior border of the liver, while the upper part is more vertical than usual. The fundus reaches the fifth or sixth interspace, but the main bulk of the stomach is located in the left hypochondrium and in the left side of the abdominal cavity.

(*b*) The *fish-hook* variety (Fig. 2) is less common but much more important than the preceding one. The pylorus maintains its normal position, but its orifice is directed upwards. From this point the pyloric portion of the viscus runs vertically downwards to the head of the pancreas, and lies parallel and contiguous to the second part of the duodenum. The lesser curvature lies below the liver and the left half of the pancreas. The cardiac pouch is often dilated, and the great curvature may extend to the right of the median line of the abdomen. The acute angle formed at the junction of the first and second parts of the duodenum causes the stomach to act at a disadvantage, with the result that dilatation of the viscus often ensues, while its muscular insufficiency becomes further increased by the drag of the enlarged organ upon the fixed part of the duodenum.

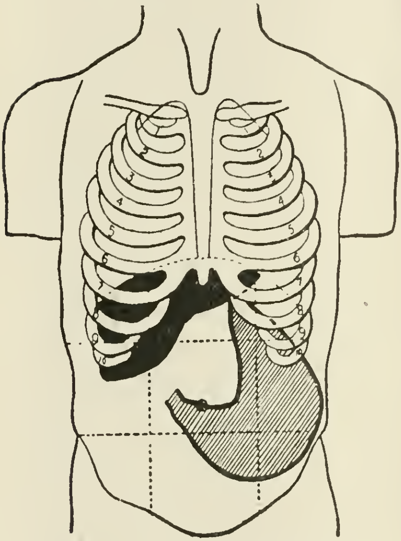

Fig. 1.—"Angular" displacement.

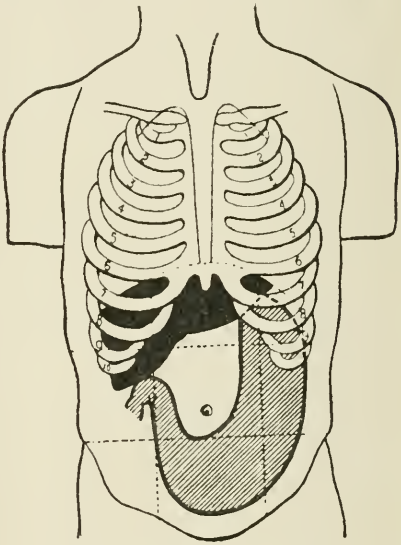

Fig. 2.—"Fish-hook" stomach.

(*c*) The *straight* variety (Fig. 3) is rare. In this form the pylorus is situated at or below the level of the umbilicus, and its changes of position are accompanied by much stretching of the duodeno-hepatic ligament. The stomach becomes elongated and its diameter diminished, while its long axis tends to assume a vertical direction. The liver is rotated backwards, and is often laterally compressed; the right kidney is loose, the spleen is depressed and deformed, and not infrequently the other abdominal viscera undergo a downward dislocation.

Causation.—Vertical displacement of the stomach is very rare in men, but is not infrequent in women. The conditions which favour its development are—(1) Severe pressure exercised upon the organ by the liver and spleen, owing to a natural or artificial constriction of the chest, and (2) extreme laxity of the abdominal parietes. According to Chapotot and other French authorities, the principal cause of the thoracic deformity is the use of a tight corset during the period of puberty, which tends to narrow all the diameters of the upper portion of the abdominal cavity, and to prevent their development during the growth of the body. The line of pressure extends from the sixth to the tenth ribs, and divides the thorax into two cones, which have their apices at the waist line. The liver being composed of a dense tissue, is often grooved across its anterior surface at the level of the ensiform cartilage, and tends to press the pylorus and lesser curvature downwards and inwards in the direction of the least resistance. On the opposite side the line of constriction crosses the stomach below the fundus, with the result that the cardiac portion of the viscus is forced upwards while the rest is pushed downwards and compressed by the spleen. In this manner the organ is sometimes moulded into two sacs, which are superimposed one upon the other. This form of dislocation is greatly favoured by the lax condition of the abdominal wall that results from repeated pregnancies, or by attenuation of the tissues in emaciated persons. All enlargements of the liver tend to press the stomach downwards and inwards, and if the spleen is also increased in size the stomach may be so squeezed between these two solid organs that it not only assumes a vertical position, but becomes so diminished in transverse diameter as to closely resemble a piece of large intestine (Kussmaul, Bouveret). In this country, where tight corsets are less in favour than in France, and are rarely worn by young girls, the dislocation of the stomach more often depends upon some malformation of the thorax or upon arrested development of the organ itself. The rickety chest, which presents much narrowing of its transverse diameter with eversion of the costal margins, is almost always associated with downward dislocation of the liver

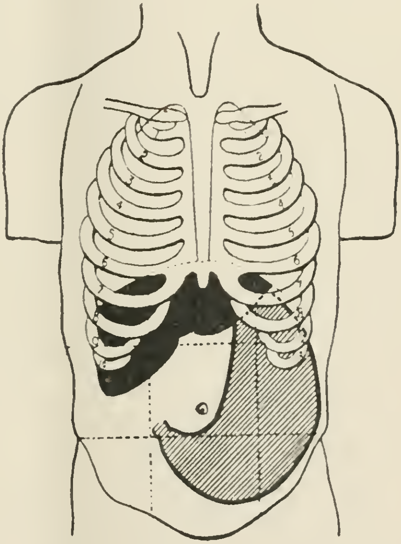

Fig. 3.—"Straight" vertical displacement.

and pylorus, while in many cases of lateral curvature of the spine depression of the liver and diaphragm give rise to a vertical displacement of the stomach. Members of phthisical families who possess a long narrow chest are also unduly prone to suffer from a vertical stomach during adult life, the abnormally short diameters of the lower thorax in such persons giving rise to a permanent depression of the liver, and thus producing a similar effect to the corset chest. It is also possible, as Kussmaul suggested, that in certain cases a vertical stomach may result from want of development, since it is known that during fœtal life the long axis of the organ is almost parallel to the spine.

Symptomatology.—During the early stages of the complaint, and in many cases throughout life, the patient seems to be in no way inconvenienced by the abnormal position of her stomach; but, as a rule, the condition is associated with definite symptoms of disordered digestion, and may even be responsible for a permanent state of ill-health. The chief troubles are experienced when the motility of the stomach becomes affected. The acute angle formed at the junction of the first and second portions of the duodenum renders the passage of chyme into the intestine a matter of considerable difficulty, and this mechanical obstruction becomes gradually intensified as the progressive enlargement of the stomach exercises an ever-increasing traction upon the fixed point. Under these circumstances, a sense of discomfort, fulness, or oppression is experienced immediately after each meal, accompanied by flushing of the face and ears, palpitation and giddiness, while occasionally the peristaltic movements of the stomach give rise to severe pain of a cramping character, followed, perhaps, by vomiting. That the abnormal position of the organ is the cause of these symptoms, is shown by the fact that they are always relieved when the patient assumes a recumbent posture, and can be almost entirely prevented by the application of a firm binder to the abdomen, so as to support the stomach and diminish the traction upon the duodenum. When muscular insufficiency ensues from the vertical displacement, secondary gastritis is apt to supervene and to obscure the symptoms of the original disorder. In this condition the ingestion of food is followed within a short time by pain, distension, and flatulence, and in many instances by acid eructations and vomiting. Constipation is invariably present, and in some instances an intractable form of mucous colitis complicates the gastric derangement. Sooner or later emaciation accompanied by anæmia supervenes, and the patient finds herself unable to indulge in physical exercise without suffering from dragging pains in the abdomen and profound exhaustion. She is also prone to become morose, irritable, and melancholic, and not infrequently exhibits a strong tendency to hypochondriasis. One of the peculiarities of the anæmia and its attendant debility is that while they remain unaffected by the administration of iron or arsenic, they rapidly respond to rest in bed and careful dieting. A peculiar and distressing symptom which is exhibited by many women who suffer from vertical dislocation of the stomach is a loud gurgling noise that accompanies the respiratory movements whenever the organ is filled with food. In such cases the act of inspiration is attended by a splashing sound in the abdomen, while during expiration a series of gurglings become audible, which may be heard at a distance of several yards. These noises become intensified if the patient yawns, coughs, or sneezes, but can be suppressed by loosening the corset, lying upon the back, or by pressure applied to the abdomen with the object of pushing the stomach towards the diaphragm. Strümpell believed that the sounds were indicative of a dilated stomach, but Glozier has shown that this condition is not necessary to their production. It would appear that the phenomenon is due to the partial constriction of the stomach aforementioned, which gives rise to the formation of two pouches superimposed one upon the other. The movements of the diaphragm and the abdominal wall during respiration cause the fluid present in the organ to regurgitate in a rhythmical manner from one sac into the other, and the splash is produced at each collision between the liquid and gaseous contents of the viscus. Occasionally the duodenum is dragged down to such an extent by the enlarged and dislocated stomach, that the opening of the bile duct becomes situated in the angle between the two limbs of the intestine (Fig. 2). In such cases bile is apt to trickle constantly into the stomach, and to be vomited at intervals (Malbranc, Riegel), as much as three pints being sometimes ejected during the course of the day (Weill). An excess of bile in the stomach is known to inhibit the action of pepsin (Bernard, Lüber), and it has therefore been surmised that the emaciation which always accompanies this abnormal symptom is the direct result of disordered digestion. It is more probable, however, that the loss of bile to the system is the principal cause of the loss of flesh, since the establishment of a biliary fistula in animals is always followed by excessive emaciation. In addition to the characteristic bilious vomiting, the patient almost invariably suffers from flatulence, loss of appetite, distension after meals, and a constant feeling of nausea.

Physical signs.—The abnormal appearance of the chest will usually suggest the possibility of dislocation of the stomach. In the majority of the cases the thorax is long and narrow, with a contraction of its lower aperture. The angle formed by the margins of the ribs on either side is much smaller than normal, and the costal borders may be almost parallel, and only separated from one another by 2 or 3 inches. When the deformity is due to tight lacing, a transverse furrow exists between the sixth and ninth ribs, while the lower aperture of the thorax appears somewhat expanded owing to eversion of the costal arch. On inspection, the epigastric region seems to be unduly flat, while the left hypochondriac, umbilical, and left lumbar regions are more prominent than usual, and give the abdomen an unequal or lopsided appearance. If the stomach be artificially inflated, it will be observed that the epigastrium remains unaffected, while the protuberance of the umbilical region and left hypochondrium is increased. On percussion the fundus of the stomach is found to occupy its normal position, and its upper border may reach as high as the fifth left interspace. The great curvature lies for the most part under cover of the ribs, but emerges near the tip of the tenth rib, and runs thence across the abdomen towards the pylorus, which is usually situated in the vicinity of the umbilicus. In the median line, only the left lobe of the liver and the pancreas intervene between the abdominal wall and the spine, and here the forcible pulsations of the aorta may be both seen and felt.

In about one-half of the cases a moderate degree of hyperacidity accompanies the dislocation of the stomach, but this abnormal state of the gastric juice rarely gives rise to any special symptoms. Dilatation of the organ is usually followed by a diminution of the secretion, and when secondary gastritis supervenes, subacidity is almost an invariable feature of the case. When gastric displacement is accompanied by enteroptosis, the right kidney is found to be loose, the liver extends 2 or 3 inches below the costal margin and is unduly movable, and the hepatic flexure of the colon undergoes prolapse.

Diagnosis and prognosis.—Vertical dislocation of the stomach is usually confused with dilatation, but with a little care the two conditions may easily be distinguished from one another. In gastrectasis the capacity of the organ is greatly increased, the fundus is dragged down and occupies the lower part of the epigastrium, the umbilical and perhaps the hypogastric region, the pylorus usually retains its normal position, and the passage of a tube will show that the viscus contains food seven hours after a moderate meal. On the other hand, in vertical displacement, the fundus usually reaches the fifth interspace on the left side, the lesser curvature lies below the liver, the pylorus is encountered near the median line of the abdomen, and no evidence of food retention can be detected by the use of the tube.

When painful peristalsis arises from traction upon the duodenum, the case may be mistaken for one of hyper-acidity or hypersecretion. Careful examination of the abdomen, however, will at once indicate that the stomach occupies an abnormal position, while exploration of the organ will prove that the gastric secretion is neither sufficiently acid nor abundant to afford an adequate explanation of the symptoms.

Vertical displacement, if uncomplicated by motor insufficiency, does not possess much clinical importance; but if it gives rise to gastric dilatation, chronic gastritis, or mucous colitis, it may initiate a state of permanent ill-health, accompanied by the symptoms that are characteristic of these several complaints. The regurgitation of bile is a matter of considerable moment, and unless carefully treated may give rise to fatal inanition.

Treatment.—The main indications are to prevent further displacement of the stomach, to support the organ, and to correct any secondary disturbances of digestion that may occur. Tight corsets must always be avoided, especially in girls who possess a long narrow chest and come of a phthisical stock. In such cases the corset should either be short and loose, or be replaced by a band of some warm firm material. Exercises undertaken with the view of strengthening the muscles of the arms, chest, and abdomen, are extremely valuable, and the patient should be taught to inspire deeply through the nose, so as to increase the capacity of the thorax. In almost every instance, a firm, well-fitting belt should be applied to the abdomen, in such a way as to elevate and sustain the stomach. The belt should be applied in the recumbent posture, and be worn both night and day.

When anæmia and emaciation are prominent features of the case, rest in bed is essential, and should be maintained for a month or six weeks. Abdominal massage and electricity are useful adjuncts in some cases. The salts of iron rarely agree, but arsenic, nux vomica, and gentian are of value, and a dose of hydrochloric acid administered after meals is an important aid to digestion when the gastric secretion is diminished. Regurgitation of bile should be treated by lavage at night, while a full dose of sulphate of sodium is given in hot water at an early hour every morning. Should these means prove ineffectual in relieving the bilious vomiting, it may be necessary to invoke surgical aid with the view of stitching the lesser curvature to the under surface of the liver.

III. Total Descent of the Stomach (Gastroptosis).—Gastroptosis is by far the most frequent form of displacement, and is usually associated with dislocation of other abdominal viscera. It is characterised by a descent of the entire stomach, the cardiac orifice being dragged down to the level of the twelfth dorsal vertebra, while the great curvature may reach any point between the navel and the symphysis pubis. The chief distinction between this condition and dilatation of the stomach is that in the former the distance between the upper and lower margins of the organ remains the same as in the normal state, while in cases of gastrectasis the apparent breadth of the viscus is greatly increased.

Frequency.—The recognition of the slighter degrees of gastroptosis being attended by considerable difficulty, it is almost impossible to determine the absolute frequency with which the displacement occurs. Meinert examined fifty girls of 12 years of age, and found evidence of gastric displacement in nearly one-half of them, while among his adult female patients some anomaly in the position of the stomach existed in 80 per cent. According to this observer, a similar condition only occurs in about 5 per cent. of the male population.

Among patients suffering from diseases other than those affecting the digestive organs, I found gastroptosis in 6 per cent. of the males and in 33 per cent. of the females.

With regard to the frequency of gastroptosis among persons who suffer from functional disorders of digestion, Einhorn detected its existence in 6·2 per cent. of his male and in 34·8 per cent. of his female patients. Out of 500 consecutive cases of dyspepsia which came under my notice at the London Temperance Hospital, the digestive disturbance was dependent upon gastroptosis in 3 per cent., while in a similar series occurring in private practice the percentage was 6·6. In both cases the ratio of females to males was about 4 to 1. It may therefore be accepted that in about 5 per cent. of all cases of indigestion the symptoms will be found to depend upon a downward displacement of the stomach or those morbid conditions which ensue from it.

Causation.—Several conditions seem to *predispose* to the development of gastroptosis. Families which possess a strong tendency to tuberculosis are unduly prone to suffer from the complaint, owing possibly to their possession of abnormally long and narrow chests, with a contraction of the lower aperture. The displacement is also exceptionally frequent in persons who have suffered from tuberculosis of the lung in early life, but have made a complete recovery. In both these cases the displacement is usually associated with neurasthenia gastrica, and the resultant symptoms are exceedingly intractable to treatment. Certain congenital anomalies of the peritoneal folds which support the stomach, such as an abnormal length of the gastro-hepatic, duodeno-hepatic, and gastro-phrenic ligaments, or an extreme tenuity of their structure, likewise predispose to downward displacement of the viscus, the degree of which increases when the body has attained its full development. In many instances of this description the floating tenth rib, to which Stiller has drawn attention, is found to exist.

Gastroptosis may be *acquired* in a variety of ways—(1) All forms of dilatation of the stomach are accompanied by a downward dislocation of the viscus as a result of its increased weight, and consequently gastroptosis is invariably met with in cicatricial and other chronic forms of obstruction of the pylorus or duodenum, as well as in severe cases of myasthenia gastrica. (2) Extensive emphysema of the lungs, especially if it be associated with some deformity of the chest or spine, always gives rise to a flattening of the diaphragm and downward displacement of the abdominal organs that lie in contact with it, and for a similar reason pleuritic effusion or pneumo-thorax affecting the left side of the chest is accompanied temporarily by dislocation of the fundus of the stomach. (3) Attenuation and stretching of the abdominal wall, associated with a diminution of intra-abdominal pressure, are potent causes of displacement of the abdominal organs, and the latter condition is therefore frequently encountered in emaciated persons whose lying-in periods have been unduly curtailed, or from whom ascitic fluid or a large tumour of the uterus or ovary has been removed. (4) Certain specific fevers, such as typhoid, influenza, and pneumonia, are apt to produce great enfeeblement of the gastro-intestinal tract, which becomes evident during the period of convalescence. In the case of enteric fever, the resultant gastroptosis is greatly increased by excessive feeding after the subsidence of the pyrexia and the presence of an enlarged and fatty liver. (5) General neurasthenia is always accompanied by a relaxation of the gastric ligaments, and for a similar reason the majority of the cases of neurasthenia gastrica are followed by gastroptosis. It is also interesting to note that the complaint is unduly frequent in women who are the subjects of mitral stenosis, and that the removal of the ovaries before the age of thirty is very apt to be followed by displacement of the stomach and other viscera. The same result is occasionally observed in neurotic individuals who have undergone laparotomy for other conditions. (6) Most writers lay stress upon the influence of a tight corset in the production of gastroptosis, and there can be no doubt that the compression of the chest which is thus brought about, hinders the development of the thorax and forces the abdominal viscera downwards. In England tight lacing is comparatively infrequent, and only existed in about 4 per cent. of the cases of gastroptosis that have come under my notice. (7) In rare instances, inflammatory shortening of the great omentum drags the great curvature of the stomach downwards, and causes much displacement of the viscus. In one of my cases the omentum was represented by two fibrous cords, which were fixed at their lower extremities to the wall of the pelvis, and had dragged the stomach into the umbilical region;

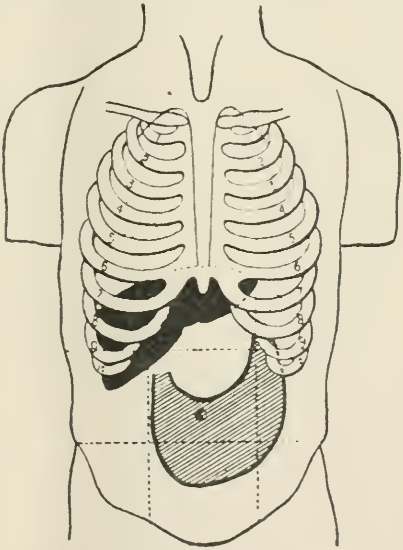

Fig. 4.—Total descent of the stomach.

while in another it formed a tight sheet, which was adherent on either side to Poupart's ligament, and had not only displaced the stomach and colon, but had also compressed the small intestines against the spine.

Symptoms.—Gastroptosis is a condition that is extremely variable in its clinical expression. In many instances, probably in the majority, it remains latent throughout the greater part of life, and it may only be as the result of a severe illness or physical shock that the characteristic symptoms are called into being. This latency is particularly common in men, and Bial has estimated that only about one-half of the male subjects of gastroptosis suffer any inconvenience from the complaint. The clinical picture which it presents also varies considerably according to its mode of causation, the nervous constitution of the patient, and the existence of complications; so that in many cases it is difficult to determine whether the gastroptosis is the primary affection or is merely a result of the coexisting neurasthenia or gastrectasis. But however complicated the case may appear, certain symptoms usually exist which prove sufficiently striking to direct attention to the possibility of a primary visceral displacement. In the first place, the abdominal phenomena prove remarkably intractable to ordinary methods of treatment, and even when they partially subside their place is usually taken by others arising from neurasthenia or gastric myasthenia. Secondly, the patient is very susceptible to psychical impressions, and immediately suffers from a recrudescence of the former troubles if exposed to mental or physical overstrain, or undergoes an emotional outburst. Thirdly, there usually exists a degree of general debility for which the most careful examination fails to detect an adequate cause, and even the effort of walking or sitting erect in a chair will often induce a sense of weakness in the back, accompanied by dragging sensations in the hypogastrium and groins. Lastly, all these symptoms are rapidly relieved when the patient is confined to bed, or a comfortable support is applied to the abdomen in such a way as to elevate and hold up the dislocated viscera.

A careful consideration of the numerous cases of gastroptosis that have come under my care has convinced me that, although the symptoms vary greatly in their nature and severity under different conditions, there is a general tendency for certain phenomena to group themselves together in such a manner that the complaint presents a series of clinical pictures in which minor or secondary symptoms form an ever-changing background. Of these, three principal forms may be recognised, the first of which is characterised by the prominence of certain gastric troubles; the second by periodical attacks of headache and vomiting, very similar to those of migraine; while in the third variety profound exhaustion is associated with anæmia and emaciation, and with vague pains in the abdomen and back.

1. *The dyspeptic form.*—This is by far the most common, and is met with in both sexes. It is especially frequent in those who come of a tuberculous stock, or who have suffered from tuberculosis in early life. The degree of gastroptosis is usually moderate, and is accompanied by looseness of the right kidney and some prolapse of the hepatic flexure of the colon. Occasionally several members of a family suffer in a similar manner after attaining the age of puberty. It is important to observe that psychical impressions exert a most important influence upon the course and severity of the complaint, and that a strong emotion, such as fear, anxiety, or worry, will always excite an attack within the course of a few hours. In severe instances the symptoms may continue with occasional remissions for many months, but in milder cases they only manifest themselves at intervals. Sleep, though sound, is usually unrefreshing, and the patient suffers from abdominal distension and flatulent eructations as soon as she rises from bed. Less frequently colicky pains are experienced in the left side of the abdomen, and several ineffectual attempts may be made to relieve the bowels before breakfast. Whatever be the constitution of a meal, oppression at the chest and distension ensue soon after its ingestion, accompanied perhaps by flushing of the face, pressure at the præcordium, and palpitation. Within a short time noisy eructations occur, and large quantities of an odourless and tasteless gas are belched up. When the symptoms are persistent the eructation usually lasts for about an hour, but during an acute attack it may continue with slight remissions for thirty-six hours or even longer. Sometimes the effort to expel the gas from the stomach produces violent retching and headache, but vomiting is rarely observed. After an attack has subsided, the whole of the abdomen feels sore and tender to the touch for several days.

The bowels are usually confined, but the patient may prove extremely susceptible to purgative medicines, and even a minute dose of calomel will often set up troublesome diarrhœa. Although there may be no actual loss of weight, the patient remains thin and ill-nourished, and often fails to put on flesh even when subjected to the most careful feeding. When pregnancy occurs, excessive flatulence gives rise to great discomfort, and after parturition a severe attack of distension and eructation almost invariably ensues.

2. *The bilious form.*—The symptoms which characterise this variety are far more often met with in women than in men, and usually develop between the ages of 24 and 40. As a rule, there is a history of a similar complaint in other members of the family, especially on the maternal side, and as a child the patient may have suffered from severe bilious attacks. The complaint usually manifests itself for the first time after a period of general ill-health, but it may develop suddenly after an attack of enteric

fever, influenza, or diarrhœa. At first the symptoms recur at regular intervals, but with the progress of time they tend to become more and more frequent, until only a few days may intervene between the attacks. Sometimes a sense of fulness in the abdomen in the early morning, accompanied by pressure in the head or giddiness, betrays the imminence of a seizure, but as a rule it develops quite suddenly about 10 A.M. or 5 P.M., and may even be preceded by a feeling of exceptional well-being. Women are very liable to suffer either immediately before or after the menstrual periods. The first symptom to appear is headache, which affects the whole vault of the cranium and is often associated with pain or pressure behind the eyes; but the ocular phenomena that occur in migraine are never encountered. The pain rapidly increases in intensity, and is exaggerated by any movement of the head, stooping or coughing, but is relieved by a recumbent posture. Within a short time nausea supervenes, and finally vomiting occurs. Temporary relief follows the evacuation of the stomach, but the headache and other symptoms soon return, and violent attacks of retching recur at short intervals. At first the ejecta consist entirely of semi-digested food mixed with a large quantity of hyperacid gastric juice; but subsequently they acquire an alkaline reaction, and are found to be composed entirely of bile and mucus. In some of my cases the vomit consisted of gastric juice, and the whole course of the disorder closely resembled that of acute hypersecretion. During the attack the appetite remains in abeyance, and any attempt to relieve the thirst is followed by sickness. The pulse is small and slow, the temperature of the body subnormal, and the urine is diminished in quantity and is alkaline in reaction. Unlike migraine, sleep is not followed by relief of the symptoms, and both the headache and vomiting usually continue during the course of the following day. Great debility and mental depression are experienced after an attack, and the patient usually loses from two to five pounds in weight during its continuance. In the intervals a certain amount of flatulence and acidity are usually experienced after meals, and there is a tendency to constipation, while examination of the stomach almost invariably proves the existence of chronic hyperacidity.

3. *The asthenic form.*—In this variety there is a complaint of persistent weakness, mental depression, and vague pains in the abdomen and back. Both sexes are affected, but it is especially common in women who have borne several children in quick succession, and have bestowed little care upon themselves during the lying-in period. Anæmia is always present, and gives rise to dyspnœa on exertion, palpitation, giddiness, and occasionally to œdema of the feet: while examination of the blood shows a moderate diminution both of red corpuscles and hæmoglobin. The appetite is poor and capricious, and the ingestion of any form

of food is usually followed by discomfort, distension, and flatulence. Want of energy and physical weakness are very pronounced, and are sometimes so severe as to render the patient a complete invalid. Very slight exertion induces exhaustion, and any attempt at physical exercise is followed by complete prostration. There is also great difficulty of mental concentration, and many persons complain bitterly of the fact that they are unable to add up figures, to keep accounts, or even to read a newspaper. Headache is a variable symptom, and when it exists is chiefly felt in the early morning or before meals. Walking or even sitting upright in a chair is accompanied by uneasy sensations in the back and by vague pains in the lower abdomen, while in many cases the patient experiences a curious feeling of emptiness in the epigastrium, and the contents of the abdomen seem as though they were "falling out." The bowels are always constipated, and not infrequently the administration of an aperient is followed by partial collapse. These varied sensations are always relieved when the recumbent posture is assumed, and the comfort that is experienced by remaining in bed probably accounts for the habits of invalidism which are exhibited by so many sufferers from gastroptosis. Splashing and gurgling during respiration, like that met with in vertical displacements of the stomach, are frequently present.

Loss of flesh is a prominent and disturbing feature of the complaint, and the emaciation may attain the same degree as that met with in diabetes or carcinoma of the stomach. It is usually found, however, that the loss of weight is very irregular, sometimes amounting to one or two pounds a week, while at others it remains stationary for several weeks in succession. The first indication of a restoration to health consists in a deposition of fat in the mammary region and an increase of elasticity of the skin, after which the body weight undergoes steady augmentation. Most patients complain of constantly feeling cold, despite the excess of clothing which they affect, and inspection of the extremities shows that the hands, feet, nose, and ears are cold and clammy and present a bluish colour. It is also noticeable that a northerly or easterly wind is invariably accompanied by an exacerbation of all the symptoms, and that a cold or bracing climate produces a most injurious effect upon them.

Physical signs.—Inspection of the abdomen during the period of digestion often affords important indications of gastroptosis. Thus in many cases the normal protuberance of the epigastrium is seen to be replaced by a hollow or transverse furrow, while the umbilical and hypogastric regions are more prominent than usual. Occasionally a practised eye will be able to discern the outline of the stomach through the abdominal wall, and if gastrectasis complicates the dislocation the peristaltic movements of the organ may also be visible. Percussion of the stomach alone is valueless, and the mere determination of the position of the great curvature not only fails to indicate the location of the viscus, but often leads to an erroneous diagnosis of gastrectasis. Even Leube's method of percussing the stomach after the introduction of water, with the patient in the erect position, fails to delineate the lesser curvature, and since the determination of the upper border of the stomach is all-important in the recognition of gastroptosis, it is necessary to employ some other procedure, such as auscultatory percussion, artificial inflation, or electric trans-illumination, which will furnish the requisite information.

Auscultatory percussion is performed in the following manner. Half a pint or more of effervescent soda-water is administered to the patient with the view of procuring moderate distension of the stomach, and he is then directed to lie upon his back with the shoulders and head slightly raised. The examiner places the end of a stethoscope over the epigastrium, and then makes a series of short taps with the index finger of the right hand upon the abdominal wall along lines that radiate from the point of auscultation. As long as percussion is made over a spot where the stomach is in contact with the parietes of the abdomen, the shock conveyed to the ear remains of the same intensity; but immediately the finger travels off the gastric area the sound becomes faint and toneless. The points at which this change occurs are marked on the skin with a blue pencil, and the investigation is continued in all directions until the entire outline of the viscus is mapped out upon the surface of the abdomen. This method is not only very accurate in its results, but is also easy of performance, and does not entail any discomfort to the patient. The only point which requires special attention is the application of the stethoscope immediately over the stomach.

Artificial inflation of the stomach may be performed in two ways: either by the administration of chemical substances which generate carbonic acid gas when mixed together, or by forcibly pumping air into the organ. Inflation by carbonic dioxide is a very old procedure (Wagner, 1869), which has recently been brought into fashion by Riegel and Boas. About 60 grs. of bicarbonate of sodium and 40 grs. of tartaric acid are each dissolved in 8 oz. of water contained in separate glasses. The patient first drinks the acid and then the alkaline solution, and is directed not to eructate any gas. The interaction of the two substances causes a rapid evolution of gas, which distends the stomach to its utmost capacity and causes its outlines to become visible through the abdominal parietes. In the second method, a soft tube is introduced into the stomach, and air is either pumped in through a hand-bellows or blown in by the mouth until the organ is sufficiently distended to be visible. Hemmeter prefers a rubber bag made in the shape of the stomach, which is introduced in the end of a soft tube and can be inflated in position.

The disadvantages of artificial inflation are that it entails a certain amount of discomfort, and, unless carefully performed, may seriously embarrass the action of the heart; while, by distending the stomach to its utmost capacity, it is apt to produce an exaggerated conception of the size of the organ and its degree of downward displacement.

Gastrodiaphany, or electric trans-illumination, is a favourite method with some Continental and American physicians, who assert that its employment serves not only to establish the diagnosis of gastroptosis, but also to differentiate it from gastrectasis. That the method is capable of affording important evidence concerning the position of the stomach has been proved beyond doubt, but that it is either necessary or even convenient to employ it is extremely doubtful. For my own part, I only use it for the purposes of clinical demonstration, as I have found that in private practice the apparatus is so cumbersome, and the passage of the tube so obnoxious to patients, that the results obtained from it are rarely commensurate to its disadvantages. Whatever method be employed, it is always advisable to mark the outlines of the stomach upon the skin of the abdomen with a coloured pencil, so that the relation of the two curvatures may be brought into prominent relief. When this is done, it will be observed that, while the normal distance between them is preserved, the upper border of the stomach lies well below the edge of the liver, and the great curvature crosses the abdomen at some point between the umbilicus and the symphysis.

Percussion over the space between the liver and the stomach affords a dull note, and the semilunar area of Traube fails to afford the tympanitic resonance characteristic of the stomach. Palpation along and above the upper border of the organ is almost always painful, and there often exists a circumscribed tender area in the epigastrium similar to that met with in cases of gastric ulcer, while the left lobe of the liver and cartilages on the left side are also abnormally sensitive. In many instances the pancreas can be felt as a hard and somewhat tender mass, lying across the spine above the stomach, and occasionally the gland exhibits distinct pulsation owing to the proximity of the aorta. These signs are due to the uncovering of the deeper structures of the abdomen by the downward displacement of the stomach, and are often mistaken for evidences of abdominal tumour, ulcer, or aneurysm.

The prolapsed stomach does not move as readily on respiration as it does in its normal position, and firm pressure by the hand will often prevent its ascent towards the thorax during expiration. Its degree of lateral mobility is also a notable feature, and when the viscus is partially filled with food it can sometimes be grasped between the hands and pushed about in all directions in the abdominal cavity. Examination of the contents of the stomach does not afford any characteristic signs. In about one-half of the cases hyperacidity is found to exist; but when gastrectasis occurs, the excess of hydrochloric acid usually disappears and is replaced by subacidity.

Complications.—Pronounced gastroptosis is extremely apt to give rise to motor insufficiency, owing to the acute flexure of the first part of the duodenum which so often occurs. In such cases symptoms of stagnation and fermentation of the food gradually manifest themselves, and the patient suffers an access of pain about an hour after each meal, accompanied by flatulence, acidity, nausea, and occasionally by vomiting. As a rule, however, the expulsion of gas from the stomach is more difficult than under normal conditions, and vomiting is only accomplished with much straining and in the recumbent posture. Loss of flesh is invariable, and the emaciation may become so severe as to suggest serious organic mischief. The effort of the stomach to force its contents into the intestine gradually produces hypertrophy of its muscular coat, and finally leads to dilatation of its cavity. It is for this reason that long-standing cases of gastroptosis are so frequently associated with the signs of myasthenia and gastrectasis. The secondary fermentations of the food that ensue from these conditions are apt to excite chronic inflammation of the gastric mucous membrane, which in its turn intensifies the sensations of discomfort after meals, destroys the appetite, and leads to rapid emaciation. Finally, the continued entrance into the bowel of food in an undigested and fermenting condition disorders the processes of intestinal digestion and excites an inflammatory condition of the colon, which manifests itself by attacks of griping pain in the abdomen and mucous diarrhœa. Chronic pharyngitis, undue susceptibility to cold, and deficient circulation in the extremities, are also frequently associated with these digestive disorders. In the present state of our knowledge it is difficult to say whether the neurasthenic and hysterical symptoms, so often displayed by the subjects of gastroptosis, are the result of the gastric displacement or of antecedent development, but there can be no doubt that the deterioration of the general health, which the dislocation of the stomach and its sequelæ so often produce, tends materially to depress the nervous system and to exaggerate the symptoms that arise from its functional derangement.

Lastly, the stomach may become twisted upon its axis, with the formation of a kind of volvulus. Of this rare condition Wiesinger has reported an instance, and Beck has successfully operated upon two cases of a similar nature.

Diagnosis.—The clinical history of the case will often indicate the probable existence of gastroptosis. Thus, if a woman who has borne several children, who has undergone an abdominal operation, or has suffered for a length of time from general debility, complains of flatulence and pain after meals which no ordinary treatment appears capable of curing, suffers from attacks of headache and vomiting at irregular intervals, or complains of extreme weakness, loss of flesh, and vague abdominal pains when in the erect position, especial care should be taken to ascertain the exact location of the stomach and the manner in which it performs its various functions. On the other hand, a diagnosis of displacement can only be made by the discovery of the malposition of the stomach on physical examination. In true gastroptosis the entire organ is found to have been dislocated downwards in the abdominal cavity, the lesser curvature lying below the liver and the great curvature considerably below the level of the umbilicus. The region usually occupied by the viscus is dull on percussion, and both the pancreas and the pulsations of the aorta can be detected on palpation above the upper margin.

The effects of treatment are also confirmatory of the diagnosis, since under ordinary circumstances little or no improvement follows the adoption of measures which prove effectual in other varieties of dyspepsia, while rest in bed and the use of an abdominal support afford immediate relief.

Gastroptosis is often confounded with dilatation of the stomach, and although the two conditions frequently coexist, it is imperative that they should be carefully distinguished from each other. A dilated stomach always occupies a lower position in the abdomen than normal, owing to the drag exercised upon its ligaments by its increased weight. It may be observed, however, that the organ is greatly increased in bulk when dilated, and hence the distance between the two curvatures is much augmented. In many instances, also, the peristaltic movements of the viscus are plainly visible through the abdominal wall, vomiting occurs at intervals, and the passage of a tube proves the existence of food retention; while a chemical examination of the gastric contents, combined with the clinical history of the complaint, will usually indicate the cause of the pyloric or duodenal stenosis.

In long-standing cases of myasthenia, the stomach undergoes a certain degree of dilatation and becomes consequently dragged out of its place. Under these conditions visible peristalsis is usually absent, vomiting is infrequent, and the evidence of food stagnation and decomposition is less marked than in pyloric stenosis.

When gastroptosis causes kinking of the duodenum with secondary enlargement of the stomach, the condition may be difficult to distinguish from an organic stenosis of the pylorus. In most instances, however, it will be found that the vomiting subsides as soon as the patient is confined to bed, that hyperacidity is absent, and that rapid improvement ensues from the use of a well-fitting belt.

Prognosis.—Gastroptosis is rarely, if ever, cured. On the other hand, careful treatment will usually relieve the symptoms, and should the abdominal walls regain their tone and the internal tension be permanently increased, the condition may cease to be a menace to health. Gastrectasis and colitis are serious complications, while the coexistence of neurasthenia or hysteria intensifies the general symptoms and retards recovery. Many of the subjects of severe gastroptosis succumb eventually to tuberculosis.

Treatment.—Much can be accomplished in the prevention of gastroptosis by careful attention to the clothing and the early correction of those conditions which are commonly responsible for its development. Young girls should never be permitted to wear tight corsets, and at all ages tight lacing should be prohibited. For a similar reason, strings and bands worn round the waist should be avoided, and buttons substituted for them whenever possible. During the lying-in period, special attention should be bestowed upon bandaging the abdomen, so as to afford a firm support to the viscera and aid the belly to regain its former shape. Any attempt to regain the figure by tight lacing should be discouraged, since the chief effect of the corset is to force the stomach and intestines downwards, while it fails to afford any support to the parietes below the waist. Care should also be taken to reduce the gaseous distension of the bowels that usually occurs after delivery, and to overcome the natural tendency to constipation. The patient should never be allowed to walk before the tone of the abdominal muscles has been restored. The same rules apply to persons who have undergone abdominal operations, and to those cases in particular where the intra-abdominal tension has been suddenly lowered by the removal of a large tumour or an excess of fluid. The treatment of the dislocated stomach itself is a purely mechanical one. In mild or recent cases, confinement to bed for a month is invaluable, as it not only tends to cut short the progress of the complaint, but completely relieves the symptoms which emanate from it.

Rest cures also act advantageously, since the patient is forced to occupy the recumbent position; while an excess of nourishment leads to the accumulation of fat in the abdomen. Under all conditions, persons suffering from gastroptosis should be advised to lie down for an hour after meals, and at the same time to loosen the corsets and clothing round the waist. By this simple procedure the symptoms that ensue during the period of digestion are rendered much less severe, and stagnation of the food is to a great extent prevented.

Lavage is of no value unless the condition is complicated by gastrectasis and chronic gastritis, nor in ordinary cases do massage and electricity produce any direct effect upon the stomach. As means, however, of strengthening the muscles of the abdomen, they are often extremely useful.

The essential factor in the treatment is the application of a firm belt to the abdomen, which will support the stomach and hold it in position. Numerous varieties have been devised for this purpose (Glénard, Landau, Bardenheuer, Rosenheim, Teufel), but it must be remembered that a belt that suits one person will not suit another, and consequently that no stock pattern can be prescribed without careful trial. Many of the corset-belts now in fashion either exaggerate all the ill effects of the corset, or afford no support whatever to the prolapsed stomach. As a rule, the binder or belt should extend from the lower border of the twelfth rib to the symphysis, and should be made of some light but firm material, which will not easily stretch. Silk elastic makes an excellent belt, but it needs constant renewal. The support should be applied when lying upon the back, and should be laced or tightened from below upwards. To prevent it from riding up, a perineal band may be worn, or, in the case of a woman, the suspenders may be attached to it on either side. For some time the belt must be worn both day and night, but when considerable improvement has taken place it may be left off when the patient goes to bed.

Surgical treatment.—Duret, in 1894, was the first to treat gastroptosis by an operation, which consisted of suturing the lesser curvature to the abdominal wall; while, three years later, Davis adopted the plan of fixing the lesser omentum to the parietes. Rovsing attempted to suture the anterior wall of the stomach, and Coffey the great omentum below the transverse colon, to the parietes; while Beyea and Bier introduced methods of plicating and shortening the gastro-phrenic and gastro-hepatic ligaments. More recently Eve has reported a case in which a successful result was attained by suturing the lesser curvature of the stomach to the liver. Although the various cases which have been subjected to operation are reported to have improved, I cannot help feeling that most cases of gastroptosis severe enough to warrant operation are of too complicated a nature to promise a cure from mere elevation of the stomach, and that the neurasthenia which invariably exists is a more important factor in the production of the symptoms than the mere dislocation of the stomach. When the gastric displacement is due to organic stenosis of the pylorus or duodenum, gastro-enterostomy is usually sufficient without suturing the stomach to the liver or abdominal wall. Fixation of the right kidney has no effect whatever upon a coexisting dislocation of the stomach, and usually increases the gastric symptoms by the induction of nervous shock.

Diet.—The food must be regulated according to the necessities of each case, and the existence or otherwise of complications.

Gastroptosis associated with healthy intestinal functions and good gastric compensation merely requires a full diet composed of substances that are easily digested. Moderately cooked and tender meats, fish, game, eggs, sweetbread, tripe, sheep's head, calf's head and feet, well-boiled cereals, farinaceous puddings, and a moderate amount of fruit may be allowed; and the patient should be encouraged to drink milk with the meals, and to indulge in cream and other forms of fat. Raw vegetables, pastry, sauces, pickles, and cheese should be avoided. When emaciation is a marked feature of the case, and is attended by neurasthenia, a milk diet is often of great value, five pints mixed with a small proportion of lime water being administered in divided doses during the course of the day.

Gastroptosis accompanied by myasthenia requires a diet suited to this important complication. The great principles to be borne in mind are to supply the stomach with those forms of food which are most easy of digestion, to avoid over-distension of the organ, and to allow a sufficient interval to elapse between the meals, in order that the viscus may completely empty itself on each occasion.

Sugars and fats in excess are always injurious, owing to the tendency of the former to undergo fermentation and of the latter to stagnate in the stomach. Butter and cream may be allowed in moderation, as well as rice and well-cooked oatmeal porridge. Lean meats, white fish, fowl, game, and eggs may be given; but soups and broths should be avoided. Spinach and asparagus may be taken in small quantities, but raw and coarse vegetables are difficult of digestion. An exclusive milk diet rarely agrees, owing to the distension of the stomach which ensues from the introduction of large quantities of fluid, and at most 8 oz. should be taken with each meal. Tea and coffee rarely agree, and cocoa proves injurious from the sugar it contains. A decoction of cocoa-husks or cocoa-nibs forms a palatable drink, and is free from the disadvantages which pertain to the other varieties. If the patient is accustomed to take alcohol, a little good brandy or whisky may be allowed; but, as a rule, half a tumblerful of hot water, sipped at the end of the meal, is more beneficial.

When colitis complicates the gastric displacement, the diet should consist entirely of finely minced fish and poultry, tripe, sweetbreads, and sheep's brains, dry toast, meat juices, clear soup without vegetables, potatoes, and plain milk puddings. Green vegetables and fruits are particularly harmful, and, as a rule, red meats should be avoided. Vichy or Contrexéville water may be taken with the meals.

Medicinal.—In uncomplicated cases drugs are seldom of much value, and the treatment is chiefly symptomatic. If the appetite is bad, a dose of nitro-hydrochloric or phosphoric acid, combined with a bitter infusion, may be given between the meals. Occasionally the sense of extreme weakness may require the exhibition of strychnine, nux vomica, cinchona, or some other tonic; while in many instances cod-liver oil, the compound syrup of the hypophosphites, elixir of phosphorus, or formate of sodium, produce a beneficial influence upon the symptoms of neurasthenia.

Pain after food and flatulence usually depend upon some morbid condition of the gastric secretion, or an increased sensibility of the gastric mucous membrane, and in such cases the compound bismuth mixture, with or without morphine, will usually afford relief. Sometimes a preparation of pepsin or pancreatine, or the tabloids of peptenzyme, appear to aid the processes of digestion. The development of myasthenia requires the addition of carbolic acid to the bismuth mixture, while in cases complicated by colitis full doses of salicylate of bismuth, cyllin, or guaiacol should be employed. The selection of a suitable aperient is always a matter of importance. As a rule, severe purgatives must be avoided, and reliance be placed on small doses of cascara and euonymin, combined, if necessary, with belladonna and rhubarb. In other cases, a confection of cascara and maltine, taken at bedtime, proves efficient; or one composed of guaiacum, senna, and ginger may be employed with advantage. When colitis is accompanied by constipation, nothing is so effectual as a small dose of castor-oil each morning before breakfast; but if severe neurasthenia exists, all purgatives may have to be omitted, and an action daily of the bowels secured by an enema of soap and water or an injection of glycerine. Carlsbad salts and other salines are chiefly indicated when myasthenia with stagnation of food exists, as their employment effects a form of internal lavage, and the fermenting contents of the stomach are swept into the intestine. In other respects the medicinal treatment of gastroptosis is conducted upon the lines laid down for the management of chronic gastritis and atony of the stomach.

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A SPECIAL CONSIDERATION OF THE SO-CALLED "PANCREATIC REACTION."

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The clinical phenomena usually described in connection with disease of the pancreas, when taken in conjunction one with another, enable the physician to make a diagnosis of pancreatic disease. The variable occurrence of many of those data, however, even where well-marked pancreatic mischief is established, allows of no specific factor being associated with disease of that organ. Lately, a new aspect has been put upon the subject by the description by Dr. P. J. Cammidge of a specific urinary reaction, based on the assumption that a definite substance is excreted in the urine in cases of this disease. He assumes fat-necrosis to occur in all forms of inflammation of the gland, especially in acute and gangrenous pancreatitis, and even in cancer of the organ. In this fat-necrosis, the neutral fat is split into its radicals—fatty acid and glycerin; the former unites with lime salts, and remains *in situ*, while the glycerin is absorbed into the blood. The detection of glycerin being a very difficult matter where the blood is concerned, he turned to the urine as a likely material in which to discover it. He believed it could be found there, as Catillon had demonstrated its presence after the administration of glycerin by the mouth to animals, recovering as much as 50 per cent. of that ingested. Dr. Cammidge next pointed out that one would look for even a larger percentage of glycerin, if given by the mouth, in cases of pancreatic disease, owing to the deficient oxidation, which, as he says, "apparently accompanies any glandular mischief." Numerous methods had already been devised for the detection of glycerin in the urine. That most commonly employed was to extract the glycerin with absolute alcohol, finally extracting the glycerin from the residue by a mixture of equal parts of alcohol and ether. When the menstrua were driven off by gentle heat, the glycerin remained behind. This method I have employed in a number of instances. The glycerin may be detected by the following tests:—

1. A little may be heated with a crystal or two of potassium hydrogen sulphate ($KHSO_4$) in a test tube, when the irritating odour of acrolein is perceived; the latter is produced by the dehydration of the glycerin, thus—

$$C_3H_5(OH)_3—2H_2O = C_2H_3COH = \text{acrolein or acrylic aldehyde.}$$

2. It brings back the colour of carbol-fuchsin previously decolorised by sulphuric acid;
3. It turns Nessler's reagent brown;
4. When burned with borax, it gives a greenish flame.

Another method for detecting glycerin in urine is based on the fact that oxalic acid in the presence of glycerin breaks up into formic and carbonic acids. This method has been employed by Lewin.

None of these procedures appeared satisfactory to Dr. Cammidge for the detection of minute quantities of glycerin, so he elaborated a new method, based on the hypothesis that, on boiling the glycerin-containing urine with nitric acid, a glucose would be produced, from which in its turn, by using phenyl-hydrazin, an osazone could be obtained. In carrying out this method, he was struck by the well-formed crystals obtained in pancreatic cases, and the entirely negative results given by normal urines, and those from other diseases, such as catarrhal and obstructive jaundice, intestinal obstruction, gastric ulcer, etc. He afterwards found that crystals were also obtained from the urine of patients in whom rapid tissue change was going on, with deficient oxidation. He was, of course, aware that the reducing power of all urines is increased on boiling with mineral acids, due probably to the presence of animal gums, but he was unable to correlate the presence of this body with his reaction in pancreatic cases.

From fallacy due to the great oxidising power of nitric acid, this simple method had to be abandoned, and another evolved, which is the basis of the so-called pancreatic reaction, which, as already mentioned, forms the chief part of his Arris and Gale Lectures for 1904.

This method deals with two separate reactions, termed "A" and "B," and the procedure is as follows. The urine must first be examined to exclude albumin and sugar, as even minute traces of the latter would cause a fallacy; the phenyl-hydrazin test should also be applied. If sugar exist, it must be removed by full fermentation. Albumin must also be removed if present.

In reaction "A," 10 c.c. of the carefully filtered urine are placed in a small glass flask, and to this 1 c.c. of strong hydrochloric acid is added. The mixture is then gently boiled on a sand-bath for ten minutes after the first sign of ebullition, a small filter being placed in the mouth of the flask to act as a condenser. To the flask are now added 5 c.c. of filtered urine and 5 c.c. of distilled water, and the whole rapidly cooled in running water. The mixture is now strongly acid, and the excess of free acid is neutralised by slowly adding 4 grms. of lead carbonate, and allowing three or four minutes for the completion of the reaction. The neutralised mixture is now filtered through moistened filter-paper, and the flask washed out with 5 c.c. of distilled water on to the filter. To the clear filtrate are then added 2 grms. of sodium acetate and 0·75 grm. of hydrochloride of phenyl-hydrazin, and the whole boiled for three or four minutes on a sand-bath. The hot fluid is now poured into a test tube and allowed to cool; after one to twenty-four hours, according to the gravity of the case, a flocculent yellow deposit is found to have settled down, and when examined by a $\frac{1}{6}$ in. objective reveals, in a positive case, crystals in sheaves or rosettes, of a golden yellow colour.

It was found that reaction "A" might give a positive result in other cases than those of diseases of the pancreas, such as pneumonia, cancer, adenitis, etc., and accordingly another procedure was evolved (to obviate these fallacies), which, in combination with reaction "A," allowed of a diagnosis of a large majority of pancreatic cases from the urine alone.

This method, termed "B," depends on the fact that the preliminary treatment of the urine with perchloride of mercury interferes with the formation of crystals in cases of pancreatitis, but does not affect them in cases of cancer of the pancreas and other conditions which give rise to the positive "A" reaction.

This differentiating reaction is termed reaction "B" by Cammidge. In it the filtered urine to the amount of 20 c.c. is thoroughly mixed with 10 c.c. of a saturated solution of perchloride of mercury, allowed to stand for a few minutes, and then carefully filtered. To 10 c.c. of the filtered mixture 1 c.c. of strong hydrochloric acid is added, and the whole boiled for ten minutes as in reaction "A." It is subsequently diluted with 5 c.c. of the mixed urine and perchloride solution and 10 c.c. of distilled water. The rest of the process is practically the same as in reaction "A." It will thus be seen that the author had evolved a method by which he was able to distinguish cases of acute and chronic pancreatitis from those due to carcinoma of the pancreas and defective oxidation. Recognising the small scope as an aid to diagnosis which this method proved, he further established certain tests by which those cases of chronic pancreatitis, malignant disease of the pancreas, and diseases non-pancreatic, could be differentiated from one another, and from acute pancreatitis. He found that, on examining a number of urines with their crystalline formations, and classifying them with the associated diseases of the pancreas, he obtained varying types of crystals, differing somewhat from one another, though having in all cases a general similarity as regards their form and arrangements. In malignant disease, for example, the crystals were, as a rule, coarser and broader than those seen in simple inflammation; and, in the latter state, the crystals from acute cases were, on the whole, finer than those seen in most instances in chronic inflammation. No hard and fast line separated one type from another; and although, to the experienced eye, differences might be suggestive, no great reliance could be placed on this alone. He next tried to differentiate the crystals of different diseases according to their solution time in sulphuric acid (33 per cent.). It was at first thought that the time of solution would depend on the size of the crystal, but although the coarser crystals usually took longer to dissolve, this was not the invariable rule. By correlating the crystal and its solution time with the disease of the pancreas found, he came to the conclusion that the time the crystal took to dissolve depended rather on the character of the inflammatory reaction in the organ, than on morphological alterations in the crystals themselves. Briefly stated, the following are the results which he obtained :—

1. The acuter the inflammatory process, the shorter the solution time, a few seconds to three-quarters of a minute being sufficient.

2. In chronic pancreatitis, from one to one and a half (rarely two) minutes were required to effect solution.

3. The crystal from malignant disease, as a rule, took from three to five minutes to dissolve under the influence of the acid.

The mean of several observations must be taken, in order that any reliance may be placed on the solution time. The crystals from non-pancreatic cases turn brown and dissolve in sulphuric acid, and in solution time most closely resemble those from chronic pancreatitis.

Phenyl-glucosazone crystals, on the other hand, in the same strength of acid, only slowly take on the brown colour, and dissolve in about five minutes or more.

Dr. Cammidge summarises in the following way the results of his examinations by the aforementioned reactions :—

1. If "A" and "B" prove negative, the pancreas is not the seat of disease.

2. If "A" proves positive and "B" negative, active inflammation of the pancreas is indicated—(*a*) the crystals obtained by the "A" method will dissolve in sulphuric acid (33 per cent.) in about half a minute, if the inflammation is acute; (*b*) if they take one to two minutes to dissolve, the inflammation is chronic.

3. If "A" and "B" both prove positive, then there may be—(*a*) malignant disease of the pancreas, crystals taking from three to five minutes to disappear; (*b*) a pancreas damaged from past pancreatitis, the crystals here dissolving in from one to two minutes; (*c*) disease not associated with the pancreas, when the crystals dissolve in about one minute.

The critical examination of the reaction.—The above reaction, useful as it seems to have proved to Dr. Cammidge in the diagnosis of pancreatic disease, is yet difficult of acceptance as it appears on paper. It invites criticism on many points, and in writing this paper it has been my endeavour to test the realiability and worth of the observations on which the reaction rests. Very shortly, indeed, after the delivery of Dr. Cammidge's lecture, Ham and Cleland, of the Pathological Institute, London Hospital, in an article,[1] published their experiences when the test was employed with normal urines and distilled water. They found that, in patients who, to all appearances, presented no evidence of pancreatic disease, the urine gave a positive result, provided the solution was sufficiently concentrated, yellow rosettes and sheaves crystallising out, after the liquid stood for about twenty-four hours. They came to the conclusion that the presence or absence of the crystals depended on the concentration of the fluid, and that the crystals themselves were due to a lead compound. To prove this they removed the lead in solution by ammonium sulphide and filtration; the fluid was then heated to drive off the ammonia and sulphuretted hydrogen, the separated sulphide was filtered off, and the resulting filtrate yielded no crystals, however concentrated they made the fluid. They also obtained crystals from distilled water, and concluded that in both cases they were due to the presence of a lead compound. Cammidge, replying to this criticism,[1] said that the technique of Ham and Cleland was at fault, and that the crystals which they obtained were in no respect identical with the pancreatic crystals; and he further pointed out that the crystals he obtained have a definite melting-point and other characters, clearly showing that they are an osazone derived from a carbohydrate body. He objects also to their methods of removing leads salts, as it introduces two factors which interfere with succeeding stages of reaction "A." He thinks that their failure to find crystals was due rather to this method of removing lead salts, than to the absence of crystals themselves. In the same paper, in a note by F. G. Bushnell (of Plymouth), the latter points out that he obtained crystals from a normal urine, but not from distilled water. He refers to a case of inter-lobular pancreatitis, in which he got a positive result from both "A" and "B," but he makes no mention of solution time; on post-mortem examination no fat-necrosis was found. It would thus seem difficult to explain the liberation of glycerin.

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[1] *Brit. Med. Journ.*, London, 1904, vol. i. p. 1347.

Next in order is an article by O. C. Gruner of Leeds,[2] in which he published thirteen cases, including three cases of cancer of the pancreas, which gave a negative result; and two cases of carcinoma round the bile duct, which gave a positive result, and in which there was no evidence of pancreatic disease. The other cases gave negative results. Gruner concluded that the reaction is not obtainable in all urines, and he found that crystals obtained from lead compounds had no resemblance to those from a positive pancreatic reaction. I may here add that no mention is made regarding the concentration or the amount of fluid at the end of the reaction.

Cammidge, replying to this in a note,[3] states that he is unable to explain his results. He does not consider it surprising that some healthy urines yielded positive results, as on prolonged boiling of the urine with a mineral acid its reducing power is increased. He further states that those cases which gave a slight reaction can easily be distinguished from true pancreatic cases. In the same issue of the Journal, Ham and Cleland describe two forms of crystals, one occurring as short needles in rosettes or less regular plumose tufts, and due to a lead compound with phenyl-hydrazin; the other occurring when barium carbonate is used as a neutralising agent, and differing from the first by occurring usually in rosettes and rarely in plumose tufts, and being obscured by yellow amorphous masses. They are smaller though coarser and less sharply pointed than the lead compounds. The solution time was not given. Replying to this article,[1] Cammidge says that 15 to 16 c.c. of fluid should be left at the end of the reaction. He does not say "A" or "B," but probably means the former. He seems inclined to attribute the finding of crystals in non-pancreatic cases to undue concentration of the fluid. In a paper,[2] Cammidge again refers to the possibility of lead chloride passing through in the filtrate, unless neutralisation and filtration be carefully carried out, and believes that the crystals of Ham and Cleland were due to concentration of the liquid and separation of lead chloride.

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[1] *Brit. Med. Journ.*, London, 1904, vol. i. p. 1462.

[2] *Ibid.*, 1904, vol. i. p. 1516.

[3] *Ibid.*, 1904, vol. ii. p. 143.

So much for the general criticism which the publication of Dr. Cammidge has evoked. I should like now to add my opinions, based on numerous experiments, carried out according to the original directions, on distilled water, normal urines, diabetics, and in some instances in cases of pancreatic disease (non-diabetic), either confirmed post-mortem or by surgical operation.

In the first place, we may touch on his assumption regarding the excretion of glycerin or glycerose, on which the test is based. The working hypothesis is that glycerin separated by fat-necrosis is absorbed and excreted, in part at least, as glycerose. He quotes Catillon's statement that in dogs 60 to 70 per cent. of glycerin given was excreted in the urine, but does not mention how much glycerin was given. As a matter of fact, in many of Catillon's experiments massive doses were given (see p. 51 of his paper)—such as 70 grms., or 10 grms. per kilo. of the animal. In a man of ordinary weight this would correspond to 700 grms. Catillon points out that in man, if a dose of less than 20 grms. be taken at one time, no glycerin at all appears in the urine, all being oxidised in the body. Only when 20 to 30 grms. are taken as one dose is glycerin obtained from the urine (p. 44).

Now, in fat-nerosis the amount of glycerin liberated and absorbed per diem must be very small indeed, and one can hardly believe that, even in cases of defective oxidation, any of it could appear in the urine.

Even if glycerin were excreted as such, it would not give any of the Cammidge crystals. I have proved this by numerous observations, and have found that glycerin boiled with hydrochloric acid yields no substance capable of forming an osazone body with phenyl-hydrazin. As a matter of fact, when glycerin is heated with strong hydrochloric acid it yields chlorine substitution products (such as mono- and di- chlor-hydrin); but this probably does not occur in the dilute solution I was using, and in any case there is no evidence that these bodies form osazones. If, however, glycerin diluted were boiled with nitric acid, I found that crystals could be obtained, and that is not surprising seeing that glycerin is a body that yields many substances on treatment with an oxidising agent. For example, if glycerin is carefully oxidised with nitric acid or bromine water, glycerose is obtained, not a simple substance, but a mixture of glyceric aldehyde ($CH_2OH.CHOH.COH$), and di-hydroxy-acetone ($CH_2OH—CO—CH_2OH$). Again, nitric acid may yield another body—glyceric acid ($CH_2OH.CHOH.CO_2H$). Under other conditions it yields glycollic acid ($CH_2OH.CO_2H$), oxalic acid (CO_2HCO_2H), and carbonic dioxide (CO_2).[1] In this way we see that many bodies may result from the oxidation of glycerin. It is, of course, true that glycerin can form an osazone with phenyl-hydrazin, but it melts at 153° C., and any crystals I obtained melted at a temperature far higher than this. Dr. Cammidge makes free use of the term "melting-point," but never informs us what it is. Having satisfied myself that glycerin as such would not, on boiling with hydrochloric acid, yield a fluid which, when neutralised, would form an osazone, I proceeded to a series of observations to see if the ingredients used in the reaction itself could form crystals of the kind described.

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[1] *Brit. Med. Journ.*, London, 1904, vol. ii. p. 152.

[2] *Lancet*, London, 1904, May 12.

I was struck by the frequency with which urines from apparently normal subjects yielded positive results, with definite crystalline masses, and proceeded to do control experiments with distilled water, everything else being carried out accurately according to the rules laid down. The first time this was done a negative result was obtained, but on repeating the experiment, I found that crystals could be obtained. That this was not a mere chance occurrence is borne out by the fact that I obtained them on six or seven occasions. Throughout I used hydrochloric acid and lead carbonate. When the fluid was examined it never yielded crystals, but when it was concentrated to 10 c.c. definite crystals in sheaves and rosettes made their appearance. They were coarser than crystals obtained from normal urine, and resisted the action of 33 per cent. sulphuric acid. They most probably corresponded to the crystals of Drs. Ham and Cleland. These results naturally led me to suspect that it was the presence of lead salts that was accountable for the crystalline deposit, and, repeating my observations with normal urines, I tested the filtrate after neutralisation with lead carbonate by means of ammonium sulphide, and obtained in every case a black precipitate of lead sulphide. The presence of the lead is to be explained by the fact that lead chloride is not a very soluble salt.

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[1] See Perkin and Kipping's "Organic Chemistry," 1903, p. 272.

Owing to the fallacy introduced by this lead compound, I tried other reagents, *i.e.*, sulphuric acid (½ c.c. to 10 c.c. of urine) and strong acetic acid (1 c.c. to 10 c.c. of urine); in the former case neutralisation was carried out by means of lead carbonate, the very insoluble lead sulphate being formed; where acetic acid was employed, sodic carbonate was used to neutralise. First, three specimens of distilled water were taken, 10 c.c. each, and boiled with 2 c.c. of glacial acetic acid for ten minutes. The resulting fluid was neutralised with sodic carbonate, and the rest of the reaction carried out in the ordinary way (boiling with sodium acetate and phenyl-hydrazin). However much the fluid was concentrated, no crystals were obtained; *e.g.*, each sample after first boiling left 10 c.c. of fluid and gave negative results; even if reduced to 7 c.c. and 2 c.c., no crystals appeared. In the case of sulphuric acid, 10 c.c. of distilled water were boiled with 0·5 c.c. of strong sulphuric acid neutralised with lead carbonate and filtered. The filtrate was heated in the ordinary way with phenyl-hydrazin, and no deposit was found at the end of the reaction. On concentration to 7 or 8 c.c. large needle-shaped crystals were obtained. While working with normal and pathological urines in the early part of my observations, none of the crystals obtained resembled the lead compound. I had followed Dr. Cammidge's rules with care. When, however, I concentrated the fluid a little at the end of the process, two kinds of crystals appeared,—one in small, fine, well-formed rosettes and sheaves, having no resemblance to the lead compound crystals; while the second, easily seen with a ¼ in. objective, resembled the lead crystals, and were coarser and larger than those I first mentioned. These fine crystals were not always obtained at the end of the reaction; but, when wanting, were generally obtained on concentrating the fluid. The crystals appeared in both reactions "A" and "B," and differed but little in the two reactions. The solution time in 33 per cent. sulphuric acid varied greatly, in some cases the crystals dissolving in one or two minutes, in other instances fifteen minutes being needed to effect complete solution. With a view to ascertaining the kind of crystals obtained when glycerin was given by the mouth, observations were made on myself and others, after the ingestion of glycerin.

A dose of 1 oz. (about 28 grms.) was taken at night, and urine collected in the morning. "A" showed numerous very well-formed crystals in rosettes, lying amongst amorphous yellow débris. Reaction "B" gave a very scanty crystalline deposit, the needles being rather in sheaves than rosettes. The crystals here differed little from those obtained in normal urines where no glycerin had been artificially given. Special analysis of such urine (after ingesting glycerin) failed to reveal the presence of glycerin itself. This indicates that the taking of a moderate amount of glycerin has very little effect on the crystals; this is further borne out by the following experiments. A lad, æt. 10, a surgical case in the Glasgow Royal Infirmary, was given 2 oz. (about 60 grms.) one evening. The urine was first carefully examined for small traces of sugar, and gave a negative result with phenyl-hydrazin. The urine at this time was also tested by reactions "A" and "B," that is, before glycerin had been administered. In reaction "A," small, fine, well-formed crystals were obtained, larger than those in "B," solution time in acid being one and a half minutes. The day after 2 oz. of glycerin had been given, the urine yielded the following result:—(1) Treated with phenyl-hydrazin, it gave no reaction. (2) In reaction "A," by Cammidge's method, very well-defined crystals slightly larger than when glycerin was not taken were obtained, and in sheaves rather than rosettes. (3) Reaction "B" gave much the same results as reaction "A." It is clear from this that even a dose of 2 oz. of glycerin had little influence upon the crop of crystals. No glycerin as such was detected in the urine.

In order to obtain, if possible, a urine free from crystals (which appeared to be rather a difficult thing to do), I examined the urine of guinea-pigs on an ordinary diet of cabbage and bruised turnips; the urine was collected over three days, 115 c.c. being obtained. As tested, it contained no sugar or albumin; it was very turbid from carbonates, and cleared up on adding acids. Phenyl-hydrazin test was negative, even when the deposit was extracted with alcohol. It was subjected to reactions "A" and "B," with these results—(1) "A" yielded a copious deposit which microscopically resembled a large number of crystals, well shaped and very like phenyl-glucosazone. They appeared mainly in sheaves. (2) Reaction "B" gave small crystals like those of acid urate of soda, coarser than in "A," and darker in the centre. In every case the guinea-pig's urine yielded this result. The urine was also boiled with acetic acid, and gave the same results, whether a neutralising agent was used or not. It was found that before the reaction, the urine, on boiling with Fehling's solution, gave no reduction until after prolonged boiling had been resorted to, when a greenish opacity was observed in the blue-green fluid. After the end of the reaction the urine on boiling readily changed the Fehling to the ordinary brick-red colour, with the evolution of gas. From this one may conclude that the body which exists in the urine at first is pretty certainly allied to the carbohydrate series, being possibly of the nature of dextrin or animal gum, which, when treated with acids, becomes of the nature of sugar, and can reduce Fehling. The crystals obtained melted between 200° and 205° C., and were therefore of the nature of a maltosazone or glucosazone; they had more of the morphological appearance of the latter.

Not only do guinea-pigs' urines react in this manner, but also many normal human urines, though with them the crystals may not be so large or so abundant. This is probably determined by the diet. The possibility of error, due to lead or other salts, was eliminated here by using a method in which no salts were employed which could be a source of fallacy, *e.g.*, by boiling with acetic acid and neutralising with sodic carbonate, this salt produced sodium acetate, and this is normally used in the phenylhydrazin test. In the case of human urines, too, one seeks the source of the crystals in some pre-existing substance which has some relationship, perhaps not well defined, to the sugar. It has been shown for some time past that many urines have their reducing power increased on boiling with a mineral acid, and various of these non-sugar carbohydrates have been described.

Blumenthal gives short accounts of the following:—(*a*) Reichardt described in diabetic patients a dextrin-like body, which gave a red-brown colour with iodine, and with prolonged heating gradually turned Fehling's solution green, and eventually a dark brown. Leube considered this body glycogen; he precipitated it by absolute alcohol, and boiled with 1 per cent. sulphuric acid, when he produced dextrose. (*b*) Leo has described a lævo-rotatory body not fermentable even after boiling with dilute hydrochloric acid; it tasted distinctly sweet. (*c*) Rosin found in diabetic urines, along with dextrose, a body that could be isolated by special tests, and concluded that it was animal gum. (*d*) Salkowski and Blumenthal have found in pneumonia a fermentable urine which gave an osazone melting at 190° C., or 10° below the osazone of grape sugar. They considered the body to be glucosamide, a derivative of glucose. (*e*) In some febrile and diabetic urines, osazones have been described with melting-points ranging from 175° to 185° C. (*see* "Pathologie des Harnes," 1903, p. 164). On looking over the above, one is not surprised that urines, after boiling with strong acids, should yield crystalline osazones; it would be almost more remarkable if they did not.

Turning now to the differentiating features between reactions "A" and "B," one can hardly regard Dr. Cammidge's statement save with grave scepticism, for we are told that, presumably, the same crystals from the same source, namely, the glycerin molecule in fat-necrosis, vary in character so much in different forms of pancreatic disease, that in acute pancreatitis they occur in reaction "A" and not in reaction "B," when a saturated solution of mercuric chloride is first added to the sample, and that the same solution (corrosive sublimate), in some mysterious way, at one time inhibits the formation of crystals in reaction "B," and at another allows them to come through. Mercuric chloride certainly attains a new value, if it can produce this remarkable and varying effect on the crystals. It seems that, although the crystals are presumably the same in both cases, the mercuric solution is able to remove them in the one disease and leave them over in the other. To my mind the only effect the mercury has, is the well-known one of throwing down albuminous matter and colouring matter, as well as certain urinary salts, *e.g.*, phosphate, urates, etc. These might certainly carry down some of the osazone-forming bodies, but why should they do this so consistently in acute pancreatitis, and not in malignant disease of the organ ? I must confess that this statement of Dr. Cammidge is a severe test on one's credulity, and I cannot propose to offer any explanation of it.

Finally, there is the part of the test which deals with the solution time of the crystals in 33 per cent. sulphuric acid. I shall give a short résumé of the points which I have already detailed (*vide* p. 421)—(1) He states that when solution time is about one minute, acute pancreatitis is indicated; (2) when two or three minutes are needed, it points to chronic pancreatitis; (3) when four or five minutes are required, malignant disease is indicated.

Although to all intents and purposes the same crystalline body is obtained in each case, for some inexplicable reason it behaves differently with the acid according to that morbid condition of the organ with which it is associated. The only explanation one could offer would be that the crystals in different cases vary in size, and hence in solution time, but this Dr. Cammidge himself points out is not the case. The solubility would appear to depend on something inherent to the crystal from any special form of disease, and as to what that is no one can hazard a guess. But, as one of his critics pointedly remarks, such a phenomenon as this would be analogous to obtaining phenyl-glucosazone crystals from urine, and then finding that they differed in solution time according as the glycosuria was hepatic, cerebral, pancreatic, or alimentary in origin. Such a supposition would strike anyone as being exceedingly far-fetched and wanting in scientific support; and yet this is what Dr. Cammidge wishes us to accept regarding his so-called pancreatic crystals. My own experience is that the crystals from normal urines vary greatly as regards their solution time, some taking only a minute and a half to disappear, others persisting for fifteen minutes, and the coarser crystals in general taking longer to dissolve than the finer ones. Some of them behave like crystals found by Dr. Cammidge, while others behave like those characteristic of phenyl-glucosazone. Moreover, I may add here that, in cases of pancreatic disease, where I had the opportunity of testing the urine, the solution time was of no help, indeed was rather misleading. In one case which I saw at the Victoria Infirmary, Glasgow, the crystals were obtained by reaction "A" and not by "B," and they should therefore have been those due to active inflammation, and ought to have dissolved in one or two minutes, but they took four or five. In another case, proved post-mortem to be one of chronic interlobular pancreatitis affecting especially the body of the organ, crystals were obtained in both reactions "A" and "B," and dissolved in one minute; these crystals, according to Dr. Cammidge, would point to a condition in which the pancreas was not affected.

Since I have mentioned these cases, I should like to cite a few of interest, where I have performed this reaction.

Case 1.—Jane M., æt. 35, single, in Victoria Infirmary, suffering from cholelithiasis with marked jaundice. Reaction "A"—Scanty, badly-formed crystals. Solution time four or five minutes. Reaction "B"—Scanty positive result (rosettes rather than sheaves). Solution in over five minutes. Malignant disease of the pancreas would be here indicated. No evidence on operation.

Case 2.—Mrs. M., carcinoma of head of pancreas. Reaction "A"—Scanty, badly-formed crystals. Solution in one minute. Reaction "B"—The same (rosettes rather than sheaves). Solution, one and a half to two minutes. This suggests a damaged pancreas from old mischief. The actual lesion was a cancer. On a second occasion the urine gave negative results ("A" and "B").

Case 3.—Pancreatic diabetes in a male. Reaction "A"—After the urine had been freed from sugar by fermentation, yielded well-marked acicular crystals in rosettes, much finer than those got from normal urine. Solution time was a half to one minute. Reaction "B"—Very scanty (small rosettes). Solution time one to two minutes. This case I saw in the Royal Infirmary, Glasgow, it being one where, at the suggestion of Dr. Allan, an attempt was made to graft a dog's pancreas on to the abdominal parietes of the patient. The patient died in coma.

Case 4.—Woman, middle-aged, with cholelithiasis; Ward 3, Western Infirmary. The urine contained bile, but no sugar or albumin. Reaction "A"—Well-formed crystals obscured by granular débris. Solution time three or four minutes. Reaction "B"—Copious deposit of fine needle-like crystals (larger than "A"). Solution in three minutes and over. This would show malignant disease of the pancreas. No evidence of same.

To show the readiness with which the test reacts with normal urines, I quote a few cases.

Case 5.—H., male, æt. 23; good general health. Reaction "A"—Positive, showing short well-formed rosettes (abundant) and fewer sheaves. Solution time from one to one and a half minutes. Reaction "B"—Positive, distinct and more marked than in "A." Solution time—in five minutes crystals still distinct; fully dissolved in fifteen minutes. There was really no evidence here of pancreatic disease.

Case 6.—P. I., male, æt. 17; ordinary good health. Reaction "A"—Well-formed crystals in rosettes rather than in sheaves. Solution time two minutes (incomplete); complete in five minutes. Reaction "B"—A few decolorised sheaves and a few rosettes coloured. Doubtful reaction. Solution time not taken.

Case 7.—J. I., male, æt. 25; ordinary good health; fasting, 1 oz. of glycerin taken at night. Morning urine examined. Albumin and sugar absent. Reaction "A"—Well-formed crystals in sheaves and rosettes; abundant granular débris. Reaction "B"—Very scanty; crystalline formation of a few sheaves. That these crystals were not due to the glycerin is proved by the fact that better crystals still were got when no glycerin had been given at all.

Numerous other observations could be recorded, but it would subserve no special object, enough having been said to indicate that crystals may be obtained from normal urines. The constant repetition of isolated observations is uninteresting and unconvincing, and I shall therefore focus my results in certain general conclusions.

1. The test as a diagnostic indication for cases of pancreatic disease has not proved itself of any real value whatever, either in my hands or those of other observers who have recorded their results. The fallacy lies chiefly in this, that although pancreatic cases as a rule yield positive results as far as the appearance of crystals is concerned, many cases, non-pancreatic, do the same; and further, that where, in genuine pancreatic cases, conclusions have been drawn as to the precise lesion, from the reactions "A" and "B," and the solution time, these conclusions have frequently been found to be quite misleading. For example, the reaction may point to the presence of a chronic pancreatitis, where in reality a malignant tumour of the head of the gland is the lesion that exists.

2. One is struck by the large number of urines, normal and morbid (I do not refer here to pancreatic disease) in which a positive result varying in degree is obtained. In some cases the crystals are small, badly formed, and indistinct; in others, clear and striking. It has even been found that urine from the same person (normal) can yield varying results—negative, equivocal, or well marked, as the case might be.

3. The occurrence of crystals is largely affected by the degree of concentration of the fluid at the end of the process, although concentration is not a necessary factor for their production. It is particularly the case that concentration leads to error when the reactions are carried out according to Dr. Cammidge's directions, the error here being due to the presence of lead salts. In many of my observations, however, this fallacy was obviated by my method of using no lead compounds, and it was in these cases that I noted how important a bearing concentration had on the test. Concentration was, no doubt, necessitated in some cases by the small amount of crystal-yielding substance present in the urine, crystals only appearing when it existed in a certain percentage.

4. It appears to me that there are at all events two sources

for these crystals, one being genuine carbohydrate or at least osazone-forming substance, the other being inorganic material, *e.g.*, lead chloride. I cannot agree with Drs. Ham and Cleland that the crystals are generally due to the latter. I consider the lead salts a minor cause of fallacy, as, when controls are done with distilled water, no crystals are obtained until the fluid is concentrated below 10 c.c. In all cases, however, in which Dr. Cammidge's method is followed, lead salt comes through, however carefully the filtration is carried out.

5. The common source of the crystals is, in my opinion, some carbohydrate body of the nature of dextrin or animal gum already existing in the urine, and inverted into a true sugar on boiling with a mineral acid or even strong acetic acid. This is borne out by the much greater reducing power of such urines after boiling, as tested with Fehling's solution. On doing the fermentation test, a very small amount of gas forms, but this can easily be accounted for by the small total amount of sugar present, and the solubility of CO_2 in the fluid.

6. In the guinea-pig's urine particularly, crystals were obtained in every case, and no concentration was required. The fallacy of lead salts was eliminated by using sodic carbonate as a neutraliser, and the form of the crystals very closely resembled that of the phenyl-glucosazone crystals; they melted at practically the same temperature. I regard these as genuine sugar-produced crystals, their source being the carbohydrate material in which the food of guinea-pigs is rich.

To sum up, while one cannot deny that these crystals occur in disease of the pancreas, at the same time one meets with crystals to all intents and purposes identical with those of pancreatic cases, in normal urines, and in urines from various morbid conditions non-pancreatic. The reaction may often be slight, but not infrequently is marked, and as there is no satisfactory means of distinguishing between the varieties of crystals (pancreatic and non-pancreatic), one is obliged, albeit reluctantly, to conclude that the test is not reliable, judged by modern clinical standards, and in hands other than those of its originator has proved not only equivocal but even misleading.

I desire to express my thanks to Dr. Renton of the Western Infirmary, Glasgow, Mr. Parry and Mr. Maylard of the Victoria Infirmary, and Mr. Paterson of the Royal Infirmary, for material kindly placed at my disposal while working at this subject.

For hints and advice, referring specially to the chemistry of the subject, I am indebted to Dr. Carstairs Douglas.

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A CASE OF INFANTILE MYXŒDEMA: ANOMALOUS RESULT OF TREATMENT.

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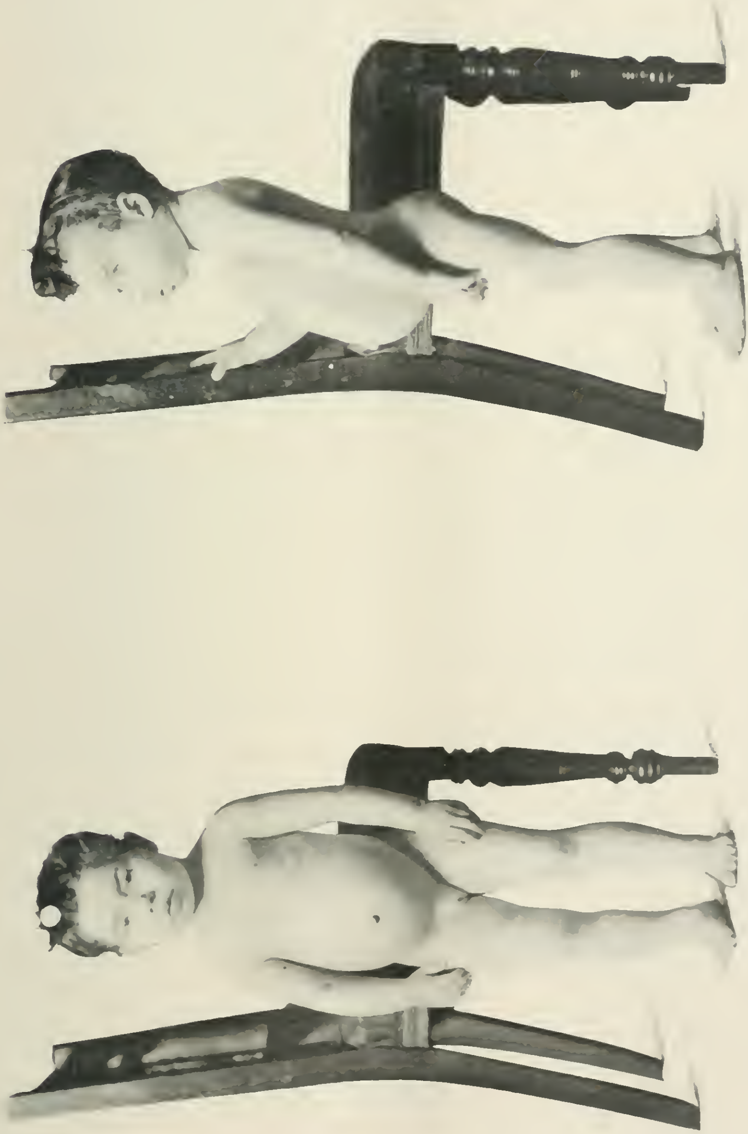
(Plate III.)

The interest of the following case lies chiefly in the comparatively small benefit which has followed treatment, and to a less extent in the slight affection of intelligence as compared with the physical defect. As regards the inefficacy of thyroid administration, without pretending to have examined all the literature of myxœdema and its treatment, I have not found any other comparable instance. Many of the cases in which thyroid feeding is said to have failed are examples of some disease other than myxœdema, such as Mongolism, achondroplasia, idiocy with obesity, and the like. In the patient whose case I describe, however, the diagnosis is scarcely questionable.

Case.—Annie C., æt. 7 years 4 months, seen at Leith Hospital Dispensary, 27th June 1899. *History.*—Patient was a full-time child, born after an easy labour, and appeared to be a healthy, though rather small, baby at birth. She was reared artificially, and began to cut her teeth at the seventh month. Dentition progressed normally. She began to speak when a little over a year, and walked at 14 months. She is said to have spoken well for her age. There have been no infectious diseases except whooping-cough at 1 year; she has had no fits, and there are no signs of rickets or syphilis. There has always been a tendency to constipation. The child appeared to develop



A. C., æt. 7. Height, 31 inches. (Average at age, 45¼ inches.)

normally until she was about 2½ years old; she then ceased to grow, and is no taller now than at that time—in fact, she at present wears some of the same clothes as she did then. The cessation of growth is ascribed to her having been run over by a lorry, but, except for slight bruising, she sustained no injury from the accident. Apart from the fact that the child stopped growing, and that her face is broader and paler than formerly, the parents have noticed no change in her appearance or demeanour. She has gone on learning to speak, and although she has never been to school or had any regular instruction, she has picked up a little from the other children, and can now say her alphabet and read letters and small words.

Family History.—Patient is the eldest of a family of five; the other children are alive and healthy. The parents are also healthy; there have been no miscarriages.

State on Examination.—*July* 27, 1899.—The child is short and stunted, and has a rather expressionless face. The nose is broad and flattened at the base, which, with the adjacent tissues about the eyes, has a rather puffy, œdematous appearance. There is slight chronic coryza. The eyelids are thick and heavy looking; the eyebrows are not scanty. The lips remain closed, but are thickened and pale; the cheeks have a pinkish flush. The forehead is slightly wrinkled transversely. The hair is hard and dry, and rather thin; there is a great deal of seborrhœa of the scalp. The limbs are thick and rounded; the hands broad and flat, and the fingers square. The extremities are always blue and cold. The skin generally is rough and dry, and does not sweat at all; the back is somewhat plentifully covered with fine down. There are fairly well-marked supra-clavicular pads. The fontanelle is firmly closed; the temperature is subnormal; the weight is 2 stones 2 lbs.

Alimentary System.—All the milk teeth, but none of the permanent set, are present. The four upper incisors are carious. The tongue is of normal size, pale, with some geographical patches. The appetite is good; there is no vomiting; the bowels are confined. *Abdomen.*—Liver from fourth rib to 2 in. below the costal margin. Other viscera normal.

Hæmopoietic System.—Spleen and glands normal; Hb, 80 per cent.; stained films of the blood show no abnormality. The thyroid gland cannot be felt.

Circulatory System.—Normal; pulse, 88.

Respiratory and Urinary Systems.—Normal.

Nervous System.—*Mental condition.*—The patient sleeps well, and is very placid and good-tempered, but not at all shy. Her attention and memory are good, and she is extremely quick in noticing what goes on around her. She speaks well, and though she has had no regular lessons, knows her alphabet, can recognise all the letters, and can read simple words. She enjoys looking at books, and can describe the subjects of the pictures intelligently, naming animals correctly, describing the actions depicted, etc. She plays with the other children, but only at the simplest games; she knows no nursery rhymes. The reflexes are normal; she has control of the bladder and bowel.

Locomotory System.—The general appearance is well shown in the photographs, and the measurements are appended in Table I. There is a slight degree of bow-legs.

TABLE I.

	June 27, 1899.	March 23, 1900.	December 27, 1900.	October 1906.
Height	35 in.	35½ in.	36 in.	46 in.
Acromion to finger-tips . .	14½ ,,	15 ,,	15 ,,	18¼ ,,
Girth of neck	9½ ,,	9½ ,,	9½ ,,	...
,, at umbilicus . . .	19¼ ,,	19¾ ,,	19 ,,	...
,, at nipples . . .	20¾ ,,	20¼ ,,	20 ,,	...
Anterior superior spine to interior malleolus.	15 ,,	15½ ,,	16 ,,	21½ ,,
Internal tub. of tibia to interior malleolus.	6 ,,	6¼ ,,	6¾ ,,	9 ,,

A *skiagram* of the hand and wrist showed centres of ossification in the os magnum and unciform, at the lower end of the radius, and at the proximal end of the first phalanges.

PROGRESS.—*July* 10, 1899.—Has lost 1 lb. Thyroid treatment began to-day, half a grain of the ordinary tabloid being given each morning.

July 27.—Dose has been increased gradually up to 3 grs. daily. The temperature has now risen from subnormal to 99°, and well-marked desquamation of skin of the legs and thighs, resembling seborrhœic eczema, has set in. The skin of the palms and soles has also begun to peel. Has lost ¾ lb. since the treatment was begun.

July 30.—Temperature, 99°·6 ; pulse, 100.

August 4.—The eczematous condition is more marked, and the skin of the hands is desquamating freely.

August 8.—Has lost 1 lb. during past week. Eczema is now subsiding. Thyroid increased to 4 grs. daily.

September 9.—Little change since last note ; the face is somewhat more expressive, but the features are little altered. Weight is now stationary. The eczema has gradually improved, and the skin, though still dry, is softer than before.

September 26.—Discharged at request of parents. During the first part of her stay in hospital the physiological action of the thyroid was very manifest. The pulse rose from between 82 and 96 to between 100 and 112, the temperature rose a degree or so above normal, the constipation diminished, and weight was lost. After about a month, however, these symptoms ceased, and although the dose was increased, the pulse fell, the constipation returned, and the temperature became subnormal. The weight remained stationary at just under 2 stones.

March 22, 1900.—Since her discharge the patient has attended hospital regularly as an out-patient, and has taken 3 grs. of thyroid tabloid daily. There is no great change to note. Her hair is much longer and more silky, and the face perhaps a little less puffy. For the last few weeks there has been a noticeable amount of permanent cyanosis of the cheeks and extremities, which are always cold. None of the permanent teeth have appeared, but the lower incisors are just visible through the gums.

A second skiagram of the hands taken about this time showed that, although no new centres of ossification had appeared in the carpus, all those previously present were enlarged, and small new centres had developed at the proximal ends of the second and third phalanges, as well as in the heads of the metacarpals. On account of the persistent coldness and feebleness of the circulation, thyroid was stopped for the time.

April 4, 1900.—Cyanosis gone; thyroid resumed, one 3-gr. tabloid daily.

December 27, 1900.—Since the end of October patient has had no treatment. She is so little altered in appearance that the description already given and the photographs taken eighteen months ago represent her present condition fairly well. She went to school for a month or two in summer, but has now ceased to attend. She does not seem to have advanced mentally since last year, but her mother regards her as quite intelligent, and she can help in the house, run messages, etc. Her age is now 8 years 11 months. No permanent teeth have yet appeared; there is no increase in the curvature of the tibiæ. The umbilical hernia has vanished. She has grown ½ in. in the past nine months.

From this date the parents, disappointed at the absence of any conspicuous benefit from treatment, could not be induced to bring the child regularly to hospital, and for five years I saw no more of her until I visited her at her home in the end of 1905. Her age then was 13 years 10 months, and her height 42 in. Apart from the fact that she had grown 6 in., her general appearance was but little altered, and she still had the facies of a case of myxœdema. Between January 1901 and February 1905 she had attended school regularly, and had made fair progress, having learned to read fluently. Although she had not seen me for five years, she at once recognised me, and after a moment or two recalled my name. From 1900 onwards she had had no treatment of any kind until February 1905 (*i.e.* from her 9th to her 13th birthday), when she resumed her attendance at Leith Hospital and came under the charge of Dr. Edwin Matthew, to whom I am much indebted for the measurements and details of treatment subsequent to that date, as well as for permission to examine the child on a later occasion.

October 1906.—She has been taking thyroid (3¾ grs.) daily for twenty months past, and during that period is thought to have improved considerably. Her stature has certainly increased, especially during the past year. (Table II.) She still retains the dull, heavy facies of a slight case of myxœdema, although, as compared with photographs taken in 1905, when the second course of treatment was begun, this is less marked than formerly. Her hair is long and silky, her eyebrows thick, and her hands no longer have their former equal appearance. Her circulation is good, and she does not suffer from cold. The skin is still dry, and does not perspire. There is no bending of the legs. With regard to her intelligence, the mother looks on her as childish, and "no use in the house." She is, however, very fond of reading, books being her chief amusement. She can sew; her memory is excellent; she can take care of herself in the street. She shows no sign (unless the rapid growth of the past few months be one) of approaching puberty. Her dentition is backward, the permanent teeth present being the incisors, canine, first molars, and one bicuspid above and below on each side; it thus corresponds with that of a child of 10 or 12.

The chief interest of the case, as has been said, is in connection with the result of treatment. In 1900, when, after thyroid had been given for eighteen months, no stimulation of growth occurred, the correctness of the diagnosis came into question. Was the patient suffering from myxœdema, or was she an example of some other form of retarded growth?

Dwarfs form a very heterogeneous and ill-understood group of cases, and the patient certainly could not be placed in any of the well-recognised categories, such as achondroplasia or rachitic dwarfing. On the other hand, no one who saw her had any doubt as to her similarity to a somewhat slight case of cretinism. Her facies and general configuration, the hands, the lordosis, the prominent belly and umbilical hernia, the harsh dry hair and skin, the supra-clavicular pads, the constipation, and the subnormal temperature, all went to make up a sufficiently characteristic clinical picture. There seems, therefore, no doubt that this is a case of infantile myxœdema, differing from cretinism only in not being congenital. The symptoms which the child presented in 1899 all bear out the history that the disease first appeared at the age of 2½ years. The first dentition was complete, the fontanelle closed, and the mental faculties fairly developed. We must therefore conclude that she was in all probability a normal child up to the end of the first dentition, and that then the arrest of development occurred. The terms infantile myxœdema and cretinism are sometimes used as synonymous; the former, however, is the better term for cases like the present in which the thyroid function has not been inactive since birth, but has been arrested in the earlier years of life.

We might *a priori* expect that in cases of juvenile myxœdema the height, weight, and degree of ossification would approximately correspond, and, in fact, such was the case here. At the age of 7 the patient was 35 in. high, corresponding to the average height of a girl of 3, the average weight at this age—30 lbs.—being just that of the patient. The ossification of the carpus also corresponded with what is normal towards the end of the third year. From the examination of thirty cases of myxœdema and cretinism, von Wyss[1] concludes that the ossification in that disease corresponds generally with that of a normal child of the same height. Quite recently, Argutinsky[1] has stated that the retardation of the ossification is by no means uniform throughout the skeleton, but affects chiefly the short cartilage bones. According to him, the presence of osseous centres in the carpus is strong evidence of a postnatal rather than a congenital commencement of the disease. Hertoghe,[2] who has seen benefit follow the use of thyroid in many forms of retarded growth other than myxœdema, states that the possibility of improvement in any given case depends on whether or not the epiphyseal cartilages have persisted, and that radiography is therefore of value in enabling us to give a prognosis.

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[1] *Fortschr. auf. d. gebiete d. Röntg.-Stahl*, 1899–1900, Bd. iii. Hefte 2 and 3.

The case, therefore, appeared a peculiarly favourable one, yet the results of administering thyroid by no means equalled what was justifiably anticipated. The growth during seven years is given in Table II.

TABLE II.

Date.	Age.	Treatment.	Height.	
June 1899	$7\frac{5}{12}$	Thyroid, 3 grs. daily.	35 in.	Period 1.
Mar. 1900	$8\frac{2}{12}$		$35\frac{1}{2}$,,	
Dec. ,,	$8\frac{11}{12}$		36 ,,	
Jan. 1901	9	No treatment.	36 ,,	Period 2.
Feb. 1905	$13\frac{1}{12}$		40 ,,	
Feb. ,,	$13\frac{1}{12}$	Thyroid, $3\frac{3}{4}$ grs. daily.	40 ,,	Period 3.
June ,,	$13\frac{5}{12}$		40 ,,	
Sept. ,,	$13\frac{7}{12}$		42 ,,	
Jan. 1906	14		$43\frac{1}{2}$,,	
Sept. ,,	$14\frac{8}{12}$		46 ,,	
Oct. ,,	$14\frac{9}{12}$		$46\frac{1}{2}$,,	

During the first period of eighteen months, though the drug was pushed so far as to produce symptoms of thyroidism, and though it excited a markedly beneficial influence on the growth of the hair, the stature remained practically unaltered. Now, as a rule, increased growth is one of the chief results of treatment. One of Hertoghe's patients,[3] a girl, æt. 18, whose stature was that of a child of 5, gained $3\frac{1}{2}$ in. in the first year, and $6\frac{1}{4}$ in. in the second; and in a case reported by Thomson,[4] which in its mildness and general character resembled this patient somewhat closely, there was a gain of $5\frac{3}{4}$ in. in the first twelve months.

During the subsequent four years (Period 2), with no treatment at all, growth took place at much the same rate—about an inch a year.

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[1] *Berl. klin. Wchnschr.*, 1906, Nos. 37 and 38.

[2] *Bull. Acad. roy. de méd. de Belg.*, Bruxelles, 1896, tome x.

[3] *Nouv. icon. de la Salpêtrière*, Paris, 1889, April 12.

[4] *Edin. Hosp. Rep.*, 1894, vol. ii. p. 254.

The conspicuous failure of thyroid to stimulate growth during the earlier period of administration, makes the comparative success of the third period (Period 3) more remarkable, especially when it is noted that on both occasions the same preparation, in practically the same doses, was given. The girl has now been under Dr. Matthew's care for twenty months, and in the last year has begun to grow quickly, having gained 4½ in. in that time. The conjecture might perhaps be hazarded that the fact she has now attained the age at which puberty normally occurs has some bearing on this.

A second feature of interest concerns her mental development. She is, no doubt, a backward child, but is far above the mildest degree of imbecility. When first seen, though she had had no schooling, she could read a little. Her sharpness while in the ward was a matter of comment. Thereafter she went to school, and learned, at least, to read well, and now she finds in books her principal pastime. Her memory, as stated, is excellent. So high a degree of intelligence in athyroidism occurring in a young child is, I think, unusual. It is difficult to say how far the treatment has influenced her mental development. During Period 1 I do not think it had much effect. She certainly became brighter while in hospital, but the improvement was no greater than what could be ascribed to her new surroundings. All the education she has received, and the power of reading, she gained during Period 2, when she had no treatment whatever. When she first came under Dr. Matthew's care, however, she was very apathetic and dull, and this has passed off since, so that she is now a fairly intelligent girl, corresponding in stature and mental development to the age of 7 or 8.

Two further points may be referred to. During the period of no treatment the eruption of the permanent teeth began, and has proceeded fairly steadily since. Notwithstanding the rapid growth of the past year, there is not a trace of the bowing of the legs which so commonly follows successful thyroid treatment.

In conclusion, I have only again to thank Dr. Matthew for his courtesy in giving me the opportunity of following up a case of so much interest.

SPINAL ANÆSTHESIA, ITS ADVANTAGES AND DISADVANTAGES.

By J. W. Struthers, M.B., F.R.C.S.Ed., *Assistant-Surgeon to Leith Hospital.*

Sufficient evidence has accumulated during the last two years to allow of a definite opinion being formed of the value of spinal as compared with general anæsthesia in surgical work. Many surgeons have made extensive use of spinal anæsthesia, and have reported their results, favourable and unfavourable, freely, and a survey of some recent work on the subject may be of value to those who have not sufficient material at their disposal to enable them to work out the subject for themselves, or who do not care to use spinal anæsthesia till its superiority over general anæsthesia has been proved.

It is claimed for spinal anæsthesia that it entails less risk to life, and that it is followed by less disagreeable after-effects than anæsthesia induced by chloroform or ether. In order to judge fairly whether these claims are well founded, a study has been made of recent papers by various surgeons, reporting between two and three thousand cases altogether. Before discussing the results with the possible complications and after-effects, attention may be directed to some points in the technique of the induction of spinal anæsthesia.

The Site of Puncture.—The puncture may be made through any of the lumbar interspaces. The majority of surgeons favour the second or third, but Dönitz, writing from Professor Bier's clinic, advises that when a high anæsthesia for abdominal operations is desired, the puncture should be made between the first and second lumbar spines. That there must be some risk of wounding the lower end of the spinal cord at this level is evident, but that should be avoided, according to Dönitz, by withdrawing the stylet from the needle used before piercing the dura, and arresting the needle as soon as it enters the subarachnoid space, as indicated by the escape of cerebro-spinal fluid. The possible risks of such a high puncture do not appear to be in any way counterbalanced by the supposed advantages, for others who habitually puncture at a lower level appear to get as high an anæsthesia without difficulty (Schwarz, Chaput, etc.). The puncture may be made in the middle line or about 1 cm. to the side. As it is desirable to enter the subarachnoid space exactly in the middle line, central puncture is probably to be preferred, for the depth at which the membranes will be entered cannot be accurately foretold, and an obliquely directed needle may easily enter the subarachnoid space to one side or even miss it altogether.

Position of the Patient.—When possible, the patient should sit with the trunk fully flexed to have the puncture made; when this is not possible, the patient must lie on one or other side with the trunk as fully flexed as possible. In some clinics (Bier, Schwarz) it is the custom to use the Trendelenburg position after making the puncture, when a high anæsthesia is desired, the object being to make the injected solution gravitate towards the head. The efficacy of this method has not been proved, and some even regard it as likely to induce complications. It is by no means generally adopted, the usual custom being to make the patient lie flat immediately after the injection has been made.

Drug to be Used and its Solvent.—For some time after its introduction, stovaine, with or without the addition of some adrenal preparation, was very extensively used for inducing spinal anæsthesia. It proved much less toxic and less irritating than cocaine. It has, however, a much more powerful effect than cocaine on motor nerves, and in some cases has actually caused complete paralysis of the respiratory muscles, besides frequently causing relaxation of the sphincter ani with the consequent involuntary passage of fæces on the operating table. The maximum safe dose of stovaine for an adult is given as 6 cgrms. (Dönitz), or 8 cgrms. (Chaput), *i.e.* 1 to 1⅓ grs. approximately. For operations involving the lower sacral nerve areas 4 cgrms. suffice; for those involving the upper lumbar and lower dorsal areas, the full dose must be employed.

Owing to the undesirable effects of stovaine on motor nerves, a return has been made by many to the use of tropa-cocaine, while Chaput now uses a mixture of 1 part of cocaine and 3 parts of stovaine.

Tropa-cocaine has apparently a less powerful action on motor nerves than stovaine, and is therefore especially to be preferred when large doses for high anæsthesia are required. The maximum safe dose is variously estimated. Schwarz, speaking from an experience of 1000 cases, puts it at 6 cgrms.

A recently introduced drug named novocaine has been also extensively used, and has by many been favourably reported on. Heineke and Läwen, however, after making a careful comparison of its action with that of stovaine, concluded that complications were more frequent when novocaine was used, while troublesome after-effects, such as headache, etc., were more often observed than after stovaine. The maximum dose of novocaine is about 15 cgrms, about 2⅓ grs.

There are various ways of dissolving the drug used for injection. Some dissolve it in distilled water with enough salt added to make the solution isotonic with the cerebro-spinal fluid. Others, especially French surgeons, dissolve it in 10 per cent. solution of sodium chloride in such strength that the amount of fluid injected is only a few minims. Others again dissolve it in cerebro-spinal fluid, which is allowed to escape before the injection is made, as much as 5 or 10 c.c. being used for this purpose, and then returned to the spinal canal. There is, as far as can be judged from reported results, little or no evidence that any one method is better than another, either for producing anæsthesia or preventing undesirable complications or after-effects. Although various minor differences in the technique practised by different surgeons exist, as indicated above, and although many are inclined to lay stress on the strict observance of the particular plan they employ as giving the best results, there is an absence of real evidence of the superiority of one method over others, the main indications being to introduce 4 to 8 cgrms. of stovaine or tropa-cocaine, dissolved in an unirritating solvent, directly into the subarachnoid space just below the spinal cord, with the most rigid precautions as regards asepsis.

RESULTS.—In the majority of cases a complete sensory and motor paralysis of the sacral and lumbar, and, with large doses lower dorsal, nerve areas is produced which allows of the painless performance of any surgical operation within these areas. The anæsthesia lasts longest in the area where it first appears, generally the lower sacral distribution, where it may last one and a half to two hours. In the legs it lasts usually an hour—possibly longer—and in the lower abdomen possibly an hour, but not infrequently less. In apparently about 60 to 70 per cent. of cases the anæsthesia is not attended by complications or followed by disagreeable after-effects; but in a number of cases complications arise during the anæsthesia, or decidedly unpleasant sequelæ follow its use.

ACCIDENTS AND COMPLICATIONS DURING ANÆSTHESIA.—*Deaths.* —Several deaths have been recorded, wholly or partly attributable to this method of inducing anæsthesia. One is reported by König. The patient was a man, æt. 35, suffering from a fracture of the patella. A week after the injury, 6 cgrms., *i.e.* 1 gr. approximately, of stovaine were injected through the third lumbar interspace in the usual way, for the operation of suturing the patella. A successful anæsthesia resulted, with complete motor paralysis of legs, bladder, and rectum. The paralysis never passed off, and the patient died three months later of cystitis, bed sores, etc. At the post-mortem examination the dura mater was found adherent to the cord from the ninth dorsal vertebra downwards, except for a small space in the lumbar region. The cord was found softened in the lower dorsal and lumbar regions. No infective agent could be found, and cerebro-spinal fluid withdrawn during life after the operation had been found sterile. No satisfactory explanation of this state of affairs was arrived at. A second case is reported by Dönitz, in which an old man, æt. 75, with cancer of the penis, died a few minutes after the injection of 13 cgrms. of tropa-cocaine. A very large dose was used here, because a long operation was anticipated for removing the penis and inguinal glands. The large dose was obviously the cause of death. A third case is reported by Chaput in a patient, æt. 30, suffering from advanced tuberculosis with a large empyema. Two cgrms. of cocaine with 6 of stovaine were injected, and a "total" anæsthesia resulted. The patient suddenly collapsed and died after the empyema had been evacuated. A fourth death is recorded by Schwarz in the case of an old man with a strangulated hernia. The patient was *in extremis* when the operation was performed, and his death was only to be expected.

Of these four deaths, only that recorded by König can be regarded as a death due to spinal anæsthesia as ordinarily carried out. The dose was not high, the patient was young and healthy, and no serious result was to be anticipated. In the cases noted by Dönitz and Chaput, large doses were used deliberately, as likely to cause less risk than general anæsthesia, the patients were extremely ill, and operation under either form of anæsthesia would in all probability have resulted in death. In Schwarz's case the patient was obviously moribund, and nothing could have saved him.[1]

Other deaths are mentioned, at second hand, in some of the papers noted below, but the writer has not had access to the actual reports of the cases themselves, and is therefore unable to refer to them in detail.

PARALYSIS OF RESPIRATION.—Four cases of complete temporary paralysis of the respiratory muscles are recorded, all following the use of stovaine. One case is reported by Dönitz, following a dose of 4 cgrms. of stovaine, in which artificial respiration was necessary for five minutes. Two cases are reported by Greiffenhagen, after doses of 8 and 10 cgrms. of stovaine, in which artificial respiration was necessary for twenty and fifteen minutes respectively. One case is reported by Sandberg, where 7 cgrms. of stovaine caused respiratory paralysis requiring artificial respiration for twenty-five minutes.

COLLAPSE.—A number of cases are noted in which varying degrees of collapse followed soon after the injection of tropacocaine or stovaine. These need not be referred to in detail, but it may be noted that every writer who has had much experience of spinal anæsthesia refers to cases of severe collapse as occurring occasionally, while cases of slight collapse are apparently frequent.

SICKNESS, VOMITING, AND INVOLUNTARY DEFÆCATION are also of frequent occurrence, vomiting being especially apt to occur in abdominal operations when viscera are being handled and pulled upon.

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[1] It should be pointed out that the papers referred to by the writer take no note of the numerous deaths which occurred when cocaine was used for spinal anæsthesia. The use of cocaine alone has been abandoned for some time, and reference is only made to deaths following modern substitutes for it.

Imperfect Anæsthesia.—Even in the most experienced hands, complete or partial absence of anæsthesia occasionally follows the injection. Thus Deetz reports four failures in 126 operations on the lower extremities, and twenty-three failures in 228 abdominal and pelvic operations. Becker reports ten failures in eighty-seven abdominal operations, two failures in thirty-four operations on the lower limbs, no failures in twenty rectal operations. Chaput states that anæsthesia is apt to be imperfect in nervous and timid subjects, while it may even be replaced by hyperæsthesia in alcoholic subjects and in those suffering extreme pain. He records nineteen failures in 309 cases. In Sonnenburg's clinic, eighteen failures were noted in 114 cases where stovaine was used, eight failures out of seventy-eight cases where stovaine-adrenalin was used, and no complete failures in eighty-two cases where novocaine-adrenalin was used. In a paper published some time ago, Dönitz recorded 4 per cent. of failures in over 300 cases. From these records it is obvious that failures occur in a considerable proportion of cases even in clinics where spinal anæsthesia is constantly used, and it should be borne in mind that a failure probably means that several punctures have been made at different levels in the lumbar region, and various pinchings and prickings carried out by the disappointed and zealous anæsthetist to test whether anæsthesia has followed the injections or not. The feelings of the patient cannot, under such circumstances, be pleasant.

After-Effects.—*Headache.*—The most frequent and troublesome after-effect of spinal anæsthesia is severe and persistent headache. Schwarz records its occurrence in 5 per cent. of his last 300 cases. How often it occurred in the previous 700 he does not state. Deetz in 360 cases had fifty cases with headache (eight of them very severe), and in one case the headache lasted more than six weeks. Chaput states that headache is often very severe, without indicating the percentage of cases in which it is to be expected. All recording a number of cases refer to its occurrence, and an estimate that bad headache follows spinal anæsthesia in 10 per cent. of cases is probably a low one. The headache is sometimes accompanied by severe backache and neuralgic pains in the limbs. Various remedies have been tried for the relief of the headache. The most efficacious appears to be the withdrawal of 5 to 10 c.c. of cerebro-spinal fluid by renewed lumbar puncture; but even this often fails to relieve.

Other After-Effects.—*Vomiting* and *fever* are occasionally noted, but are not apparently serious or of long duration when they occur. A more serious, though fortunately rare sequel is the occurrence of paralysis of varying extent. König's case, which resulted in death, has already been noted. Trantenroth reports a case in which an almost fatal collapse occurred, followed by violent headache and a partial paralysis of the right leg, lasting more than two months. Dönitz refers in his paper to two cases of paraplegia of long standing following spinal anæsthesia, recorded by Bosse. Adam and Roeder record respectively one and two cases of sixth nerve paralysis, and other cases have been reported.

Apart from two cases occurring in Sonnenburg's clinic, and reported by him some time ago, no case of infective meningitis caused by lumbar puncture has, so far as the writer is aware, been recorded. When proper precautions are taken, infection can be prevented, and the danger of infecting the spinal canal is so small that it cannot reasonably be urged as an objection to the use of spinal anæsthesia.

After a perusal of the records on which the preceding statements are based, it is difficult to agree with those who claim that spinal anæsthesia is to be preferred to general anæsthesia either in the interests of the patient or the operator. Serious complications attending its use are not infrequent; troublesome sequelæ are common. Its extent and duration cannot by any means known as yet be accurately controlled. Even in the cases where it succeeds perfectly, the great drawback to its use still remains, that the patient is fully conscious during the operation. Were it used only for minor operations such as those suitable for local anæsthesia, this would be of little importance, but for major operations it is, to many, an insuperable objection to the use of spinal anæsthesia. The mortality in the published records is little, if at all, below that attending the use of chloroform, and greater than that attending the use of ether, when these drugs are carefully administered. The unpleasant sequelæ, although possibly less frequent than those following general anæsthesia, are quite as troublesome and distressing to the patient, if not more so. Unless means are discovered to materially lessen its dangers and to regulate more accurately its duration and extent, it seems doubtful whether spinal anæsthesia will retain the popularity which it has in some quarters attained.

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REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

American Practice of Surgery. A Complete System of the Science and Art of Surgery, by Representative Surgeons of the United States and Canada. Edited by JOSEPH D. BRYANT, M.D., and ALBERT H. BUCK, M.D., of New York City. Complete in Eight Volumes. Profusely illustrated. Vol. I. New York: William Wood & Co.

IT is the laudable ambition of Americans to be first in everything, and to succeed in beating all existing records. The present undertaking is a striking outcome of this national trait, and it may at once be said of it that it reaches what they call "the limit." In weight and bulk we estimate that it will exceed what the average man could carry from one room to another; in other words, it is gigantic. The editors are men of reputation, and Dr. Bryant's popularity and influence with his fellow-countrymen are evidenced by his having been elected President of the American Medical Association. The list of contributors includes, with some notable exceptions, the best known surgeons of the United States and Canada. No foreign writers have been invited to take part in the work, and it is therefore distinctively American in character. The book is printed from plates made from specially cast type, and printed on paper of quality which combines perfect press-work with ease in reading. In this respect the work marks a great advance on any similar system of surgery.

The introduction, by Stephen Smith, is an elaborate affair, and runs to sixty-seven pages. It gives an interesting résumé of the evolution of American surgery, with short biographical notices and portraits of the pioneers who contributed most to its development. Among others selected for mention are Dr. John Jones, the father of American surgery; John Warren, a younger brother of the General who fell at Bunker's Hill, and first Professor of Surgery at the University of Harvard; Wright Post, first Professor of Anatomy and Surgery in the College of Physicians and Surgeons at New York; Valentine Mott, whose name is familiar to us on this side as having named the pendulous tumour of the scalp known as "pachydermatocele"; Willard Parker, Hayes Agnew, Bigelow, Samuel Gross, and many others.

There is also a short history of the literature of American surgery, and among the many achievements which it is the honour of American surgeons to claim, we may refer to operations upon the larger arterial trunks, to improved methods of amputation, to the anatomy of dislocations and the treatment of fractures, to the perfection of the operation for the removal of stone in the bladder—litholapaxy—to the treatment of hip disease by weight extension, to the raising of orthopœdics into an important specialty, to many notable advances in gynæcological surgery, to pioneer work in ovariotomy, to the discovery of anæsthetics —the name anæsthesia having been suggested by Oliver Wendell Holmes, and last but not least to the elucidation of the lesions of the vermiform appendix and their operative treatment.

The introduction concludes with a quotation from a well-known paper by the late Mr. Erichsen, which might well be echoed by any surgeon visiting America to-day: "I know no country in which, so far as it is possible to judge from contemporary medical literature, there is so widely diffused a high standard of operative skill as in the United States."

The subject-matter proper of the first volume begins with Surgical Pathology, and the first section is from the pen of Alfred Scott Warthin of Ann Arbor, Michigan. This author follows the teaching that the process of inflammation is at bottom protective and reparative, and is the result of reaction to all irritations of tissue however produced. Although not regarded as synonymous with bacterial infection, as has been assumed by some writers, it is conceded that, as far as surgery is concerned, it is chiefly of bacterial origin. Inflammation is described as an exaggeration of normal body functions—a struggle for protection and self-preservation—becoming manifest as the reaction to local injury.

We might criticise in this chapter the description of the healing of wounds under the unfamiliar heading of "The Healing of Inflammations," and under treatment the absence of any reference to the work of Professor Bier of Bonn, whose name is not even mentioned in the index. It may be noted that most of the pathological plates illustrating this section are borrowed from the well-known work of the late Professor Ziegler.

The difficult subject of chronic inflammation is handled very dexterously—we say difficult, because, even more than in the case of acute inflammation, there is apt to be confusion with the processes of repair. The inclusion of chronic ulcers under this head is an innovation of doubtful value.

The second section, on "The Disturbance of Nutrition," is written by Albert George Nicholls of Montreal. Here we have a vast amount of material which is usually reserved for works on general pathology: hypertrophy, atrophy, degenerations, infiltrations (under this head there is an account of gall stones and urinary calculi), necrosis, gangrene, ulcers, and caries. It is not transgressing the limits of criticism to suggest that a great deal of this is better dealt with in a work on general pathology, and that much of what remains would have been better considered with the surgery of the individual regions.

The third section, by Nichols of Boston, is a very excellent one, and it is perhaps no drawback that it describes once more what has already been considered in the chapter on inflammation.

The difficult subject of tumours is ably dealt with by Nicholls of Montreal, who adopts the classification of Adami. The parasitical relations of cancer are dealt with in a special chapter by Gaylord of Buffalo. When we say of the following chapters that that on wound infections is by Pilcher of New York, that on shock is by Bloodgood of Baltimore, that on surgical diagnosis is by Bryant of New York, and that on the body fluids is by Bruce of New York, it will be readily believed that they are of the highest possible excellence. The next chapter, on the radiographic interpretation of the epiphyses, by Hickey of Detroit, is a most able article on novel lines, rendered the more valuable by the large number of excellent illustrations. The same may be said also of the technique of radiographic work by Dodd and Osgood of Boston.

The concluding sections of this volume are by Moore of Minneapolis on General Surgical Treatment, and Bacon of Newhaven, Connecticut, on General Surgical Prognosis. We may say in conclusion that, while the volume is too exhaustive to lend itself to detailed criticism within the limits at our disposal, we cannot withhold our expression of the highest admiration of its merits as a work on surgery, and of the efforts of those who have contributed to its production.

A Short Practice of Medicine. By Robert A. Fleming, M.D., F.R.C.P.Ed. London: J. & A. Churchill.

The impossibility of compressing all the practice of medicine into an ordinary course of lectures is now universally admitted, and, among the various ways of evading the difficulty, that proposed by Dr. Fleming in his preface has much to commend it. The student should be armed with a text-book of reasonable size giving the fundamentals of the subject, so that the teacher in his lectures may content himself with amplifying this where needed, vivifying the whole with the spoken word, and showing his hearers medicine in its true perspective. A text-book written with this end in view must of necessity be quite different from a work of reference. It must aim, first, at imparting a sound knowledge of the facts of medicine, and, second, it must practically be a book which will serve for purposes of examination. The qualities which we demand are accurate statement of well-proven facts, lucidity, so that the book may be easily mastered, and a logical, systematic arrangement, so that when mastered its contents may be remembered. Original fancies and speculations are out of place, and brilliancy is neither to be expected nor desired. Dr. Fleming's text-book admirably fulfils these requirements. As to its accuracy, very few statements can be called in question; it is most clearly, simply, and carefully written; and pains have obviously been taken to group symptoms systematically and to maintain the same arrangement throughout. All this will make it eminently serviceable to students.

Turning now to a more detailed account of its contents, one comment which we have to make is that there is a tendency here and there to repeat hackneyed statements in a rather uncritical way. This is most noticeable in the paragraphs on etiology: take, for instance, chorea, which is said to be due to (1) peripheral irritation, (2) rheumatism, (3) endocarditis, and (4) fright and imitation. Now it is more than doubtful whether a long prepuce, dentition, or imitation ever did produce chorea; what should be impressed on the reader is that it is a case of rheumatism first, the rest nowhere. Many of the paragraphs on etiology would be the better of revision from this point of view. On the other hand, Dr. Fleming can be most concise and practical when he likes, as the following sentence, bearing on a minor topic which has often been discussed at a length quite disproportionate to its importance, shows:—"Albuminous expectoration has been recorded as a sequel to paracentesis. It really constitutes a form of œdema of the lungs, causing intense dyspnœa, and may prove fatal; fortunately, it is of rare occurrence." This is thoroughly to the point, and much of the book is written in the same way. The book opens with a description of the infections, which is, on the whole, excellent. The description of Koplik's spots requires recasting, and a fuller account of septicæmia would be an advantage. Under general diseases, the relation of the Islands of Langerhans to diabetes might have been mentioned, and the importance of fat in the dietary of the disease more fully insisted on. Next comes the alimentary system, and while realising the difficulty of giving a systematic account of gastric disorders, we think that a more modern classification of dyspepsias than that into irritative, atonic, and oxaluric should have been adopted. More prominence should also be given to disturbances of motility. The chapter on blood diseases is good, but reference to polycythæmia vera is omitted. The remaining chapters on circulatory, respiratory, urinary, and nervous diseases are thoroughly satisfactory. Dr. Fleming has evidently taken great pains to bring his book up to date, by including references to recent work of definite value. Thus the opsonic index, typhoid vaccination, heartblock, the spirochæte of syphilis, and Head's researches on sensation, are all mentioned. Again, treatment is dealt with in a full and practical manner. The criticisms we have made in no way detract from the high opinion we have formed of Dr. Fleming's book. A student who thoroughly masters its contents should have little fear of his examiners, and we are confident that it will appeal to, and be found serviceable by, the class of readers for whom it is designed.

A System of Gynæcology by Many Writers. Edited by THOMAS CLIFFORD ALLBUTT, M.A., M.D., LL.D., Regius Professor of Physic in the University of Cambridge; W. S. PLAYFAIR, M.D., LL.D., F.R.C.P.; and THOMAS WATTS EDEN, M.D. (Edin.), F.R.C.P. (Lond.), Assistant Obstetric Physician, Charing Cross Hospital. Second Edition. London: Macmillan & Co. Ltd.

IT is ten years since the first edition of Allbutt and Playfair's "System of Gynæcology" was published, and we note many changes in the present volume. Death has removed the responsible editor, Dr. Playfair, whose place has been most worthily taken by Dr. Watts Eden. Besides the editor, four other contributors to the first edition have died—Sir William Priestley, Knowsley Thornton, Greig Smith, and Milne Murray. The places of the first three have been taken by eminent specialists, while the article on "Electrical Treatment" by Dr. Milne Murray has been very much condensed, and forms part of a new contribution on "Minor Uterine Operations" by Dr. Amand Routh. It is interesting to note that Dr. Routh points out that since 1896 the advance of surgery has made hysterectomy for fibroids comparatively safe, and that, therefore, electrical treatment has been persevered with by few. Now, however, he thinks the pendulum has perhaps swung too far towards hysterectomy in all cases, and that electricity is used too rarely.

The article on "Pelvic Hæmatocele," by Sir William Priestley, is replaced by an excellent chapter by Dr. Blacker. The paragraphs on etiology are especially interesting, and the modern pathology of hæmatocele in relation to extra-uterine gestation and other causes is dealt with most skilfully. The article on "Ovariotomy," which was written by Mr. Greig Smith in the first edition, is from the pen of Professor J. W. Taylor, and it is not necessary to say more of it than that it is complete in every detail, and is worthy of the author.

Professor Herbert Spencer replaces the late Dr. Knowsley Thornton as the writer of the chapter on "Hysterectomy." Considering the many vexed questions as to when and how to do this operation, his task has not been easy; but Dr. Spencer has treated the whole subject in a masterly way, and there is no doubt as to his views. He is a strong advocate of pan-hysterectomy. In his opinion, though all will not agree with him, total hysterectomy is destined to replace the supravaginal amputation, just as the intraperitoneal treatment of the stump replaced the extraperitoneal.

Among other changes in authorship, we note that Dr. Champneys discusses sterility in place of Dr. Gervis. The article on the "Etiology of the Diseases of the Female Genital Organs" has wisely been deleted, and that by Dr. Boxall on "Diagnosis" is replaced by one on the "Methods of Pelvic Examination" by Dr. Berry Hart.

No addition is more valuable or will be more appreciated than the contribution on "Chorionepithelioma Malignum." In this edition it is the subject of a separate article, and is written by two of the most eminent authorities—Dr. Eden and Dr. Teacher. It is beautifully illustrated, and gives a complete account of all that is known of this remarkable form of malignant disease.

There is a new article by Dr. Hellier on "Gonorrhœal Infection of the Female Pelvic Organs," and it proves a very instructive chapter. Dr. Hellier very properly insists that patients and the profession should regard this disease more seriously. Dr. Eden contributes a new article on "Antisepsis and Asepsis in relation to Gynæcological Surgery." It is excellent, and should prove a useful guide to operative practice.

The chapter on "Diseases of the Ovary" is practically a new one, by Drs. W. S. A. Griffith and Herbert Williamson. It is adorned by numerous good illustrations, and the pathology of the various conditions has been much expanded. The last chapter in the book is a new and useful one on "The After-Treatment of Gynæcological Operations," by Dr. Herman.

Of the other articles it is sufficient to say that for the most part they show signs of careful revision. There has been great progress in gynæcology during the past decade, chiefly on pathological and surgical lines, and these numerous advances in our knowledge have been carefully incorporated in the various articles. Withal, it is a matter for congratulation to the editors that the second edition is not increased in size, but rather diminished. A work by many authors necessarily contains articles of unequal merit, but this fault is not very striking in the present volume, and it may be truly said that the "System" has been so brought up to date that it reflects very accurately the theory and practice of modern British gynæcology.

A Guide to Diseases of the Nose and Throat and their Treatment. By Charles A. Parker, F.R.C.S.Edin., Surgeon to the Throat Hospital, Golden Square, W. London: Edward Arnold.

It has been the author's aim in this work to give the tyro such information as will assist him in his clinical studies, and especially to lay down full instructions as regards treatment. He has therefore omitted anatomical descriptions with the exception of a short sketch of the anatomy of the outer wall of the nose, and he has not dealt with the physiology of these regions. His desire to give treatment as full a consideration as possible has resulted in burdening the text with a very large number of prescriptions, some of them with five, or even more, ingredients; these might, we think, with advantage have been, to a large extent, omitted, or they might all have been relegated to an appendix.

The classification of diseases does not seem to us to have been altogether happy: he deals first with a description of complications of the upper respiratory tract in relation to general medicine. The section is devoted mainly to the infective granulomata, and as nothing more is said about the larynx for another 300 pages, there is thus an absence of continuity. Diseases are considered entirely from their clinical aspect, the pathology is described only in so far as it is an aid to diagnosis, but the discussions on treatment are full.

The descriptions are rather uneven. Some are excellent, namely those of certain of the chronic inflammatory affections of the nose, including the diseases of the accessory sinuses; while the descriptions of laryngeal conditions are, on the whole, of a lower standard. The radical methods of operating for frontal sinus suppuration receive rather scanty attention; Killian's operation is merely mentioned; nothing is said about clearing out coexisting ethmoidal disease, nor about remedying the subsequent deformity. In treating extensive ethmoidal disease, Lack's operation is advocated; this necessarily means working in the dark. It has always appeared to us questionable if this method can be sufficiently radical, or, given that it is radical, if it is safe.

Under ozæna are included syphilitic and tuberculous processes, producing atrophy and crust formation.

In discussing the treatment of septal deformities, the older operations seem to be preferred to the modern submucous resection, which gives, in skilled hands, such excellent results. Of the chapters devoted to diseases of the larynx, that on new growth is certainly the best. The spasmodic affections of the larynx are somewhat shortly treated; laryngeal vertigo is discussed in a few words, and the rather surprising statement is made that its pathology is very doubtful.

In the section on foreign bodies in the larynx, though bronchoscopy is mentioned, no description is given of the method. Descriptions of one or two of the rarer conditions have been omitted, such as congenital atresia of the choana, prolapse of the sinus of Morgagni, and keratosis of the larynx. The literature of the subject, especially continental literature, is somewhat scantily referred to.

There are a large number of illustrations, in black and white, of various diseased conditions, of operative procedures, and of instruments. With the exception of the last, these add very appreciably to the value of the book, but we fail to see the use of introducing illustrations of instruments which can be seen in any instrument catalogue.

The Diseases of the Nose and its Accessory Sinuses. By H. Lambert Lack, M.D. (Lond.), F.R.C.S. (Eng.), Surgeon to the Throat Department of the London Hospital. Longmans, Green, & Co.

Those who are acquainted with Dr. Lambert Lack's work upon the nose in connection with Cheyne and Burghard's Manual of Surgical Treatment, will not be surprised at his having amplified the chapters which appeared in these volumes. He now presents the profession with a very complete text-book upon the diseases of the nose and its sinuses. In connection with the affections of the upper air passages, the nasal cavities probably offer a more interesting and a wider field for research, and for successful therapeutic measures, than any of the neighbouring parts. In its general arrangement the volume before us follows the plan commonly adopted in such treatises. It opens with a good anatomical description of the nasal cavities and adjacent sinuses, in which the chief clinical points are emphasised. Following this we have a chapter upon the examination of the nose, and another upon general considerations in regard to treatment. Then follows a chapter upon nasal obstruction, its symptoms and effects, and a general consideration of the symptoms of nasal disease. The different diseases are next discussed in detail.

The author enters with some minuteness into the theories regarding malformation of the hard palate, which is met with in children who suffer from nasal obstruction. He draws special attention to the associated changes in the lower jaw, and points out how some writers in discussing the etiology of palatal deformity have entirely overlooked the existence of changes in the mandible. It is impossible in a short review to take up the different points dwelt on by the author, but we would merely draw attention to the deduction which he draws from the associated lower jaw deformity. He considers that both result from the lateral compression due to the increased tension of the soft tissues of the cheeks, which follows upon the presence of the open mouth. The section is an interesting one. Dr. Lack devotes a good deal of space to the consideration of debatable points in rhinology, and we regard such discussions as not only enhancing the value of his book, but as raising it distinctly above the ordinary standard of many of the present-day text-books. In addition to the section on deformity of the jaws, we would draw attention to the chapters upon ozæna, nasal polypi, fibrinous rhinitis and asthma, as well worthy of careful perusal.

In discussing the operations for remedying deflections of the nasal septum, we find ourselves at variance with the remarks which Dr. Lack makes regarding the submucous resection operation which is now so much in vogue. He quite admits the advantages which the procedure offers as regards the simplicity of the after-treatment and the absence of the necessity for the use of splints. In regard to his remarks upon the operation itself, however, we must join issue: "bleeding soon obscures the view, even if suprarenal extract is applied, endless sponging is necessary, and the operation in many cases requires an hour or two hours or more of general anæsthesia." In our experience, if due care be taken in the preparation of the septum, the operation may be carried out practically without any bleeding at all, so that sponging is unnecessary, and an excellent view is obtained. General anæsthesia is not required, save in a few cases. This is probably the experience of the majority of operators.

We turn with special interest to the chapters upon accessory sinus disease,—of which there are nine,—as Dr. Lack has already made a name for himself in this subject by his previously published work. They contain a great deal of most valuable information which is well expressed, and which must prove most useful to the student interested in the subject of nasal suppuration. As we have indicated, the author is entitled to write with authority, and the opinions which he expresses on many interesting points are most worthy of the careful consideration of other workers in this branch of rhinology, even though they may not be in agreement with all of them. In the treatment of acute suppuration of the sinuses, Dr. Lack has found local blood-letting a most effective and rapid means of reducing the inflammatory swelling in the nasal cavities. He makes free incisions through the mucous membrane, along the middle turbinated body and the outer wall of the nose just below the ostia of those sinuses which open into the middle meatus. We refer specially to this, as we have not seen it mentioned in other text-books. The description of the Killian operation for the treatment of chronic suppuration of the frontal sinus is incomplete, nor is it indeed quite accurate. It is a pity that the author makes use of the word sinusitis, though fortunately it occurs very seldom in the text. The term is used so frequently now by writers on nasal suppuration, that it has become generally accepted. This fact, however, is no excuse for its adoption, and we would deprecate the tendency to anglicise a word derived partly from a Latin and partly from a Greek source.

Viewed as a whole, Dr. Lack's volume must be regarded as a valuable contribution to the study of nasal disease, and we heartily congratulate him upon its appearance. It is not only a sound practical treatise, but will prove a most useful book of reference. The author has been very generous in his references to the work of others in similar fields, a remark which cannot always be applied in this connection.

NOTES ON BOOKS.

Dr. F. P. Nunneley's little volume on *Aneurysm of the Abdominal Aorta* (Baillière, Tindall, & Cox, London) is a dissertation for which he received the degree of Doctor of Medicine from the University of Oxford. It is a clinical study, based on a series of thirty-two cases collected from different hospital records. The disease is rare, its case incidence being only 2 per 1000 among London hospital patients; hence Dr. Nunneley's method is the only one available for anything like a thorough study of the subject. In the prefatory note the writer expresses his obligation to Professor Osler, and the dissertation reminds us of those valuable clinical studies which so frequently appear from the press of the Johns Hopkins Hospital. It contains in short compass practically all that is to be said concerning aneurysm of the abdominal aorta, and those interested in the condition cannot do better than refer to its pages.

Dr. Blackham's *Care of Children* (The Scientific Press, Ltd., London), new and revised edition, is a sensibly written and practical guide in matters appertaining to the nursery. The information given is clear and to the point, and covers almost all that a nurse or parent need know. The author has avoided inserting matter calculated to lead to amateur doctoring, and the reiterated advice to seek medical aid in even trivial matters, if followed, will often prove economy in the long run. The only criticisms we have to offer concern the diet suggested for children after eight months (p. 11), which is unduly varied, and hardly suited for infants under a year, and the table of infectious diseases on pp. 53 to 54. The latter should be revised so as to harmonise with that of the Society of Medical Officers of Public Schools, which is the recognised standard in this country. In the table as it stands, the incubation and infection periods often differ from those of the other table—a circumstance which may well perplex the conscientious parent of school children.

In *The Treatment of Diseases of the Digestive System* (Chas. Griffin & Co., London) Dr. Saundby has put on record his personal experience "as a foundation on which each reader may raise a more important superstructure." In the introduction there is a short but sufficient account of modern gastric methods; but when we come to the body of the book, we find ourselves wondering whether these are really any great aid to treatment, so little reference is made to them. As a matter of fact, Dr. Saundby's treatment is largely symptomatic, and for this reason his book will be found as valuable to those who rarely pass a stomach tube, and never give a test meal, as to those prepared to employ such means of investigation. The directions as to dietetic, medicinal, and climatic treatment are sound, while in discussing the indications for operative interference, the author steers a middle course between conservatism and excessive desire for surgery. A book based entirely on personal experience can scarcely be criticised for omissions, or we would protest against the absence of reference to Van Noorden's plan of treating mucous colitis, which is probably the most satisfactory yet introduced. Dr. Saundby, however, regards the disease as of no great moment, and treats it with the old-fashioned remedies for catarrh of the colon. In our experience, it is just this line of treatment which is so seldom successful. With this reservation, we think Dr. Saundby's hints on the management of digestive disorders are sound and useful.

Three Hunterian Lectures, with an appendix and table of cases, are published under the title of *Gastric Surgery*, by H. J. Paterson, M.A., M.B., F.R.C.S. (Baillière, Tindall, & Cox, London, 1906). Special attention is paid to gastro-jejunostomy, "the keystone of gastric surgery."

The author recommends the anterior operation, a large anastomotic opening, excision of portions of mucous membrane, and the use of anchor sutures to prevent kinking of the jejunum. The dreaded "circulus vitiosus" he regards as due not to entrance of bile into the stomach, but to obstruction at the anastomotic opening. Evidence is given to show that gastro-jejunostomy does not appreciably interfere with metabolism. In skilled hands the mortality may now be under 4 per cent. For chronic gastric ulcer this operation is considered superior to excision of the ulcer, not more than 10 per cent. showing any relapse. For perforation of gastric ulcer, the procedure recommended is closure of the perforation, no sponging or flushing of the peritoneal cavity, but the performance of gastro-jejunostomy, which allows calomel to be given within a few hours, and usually prevents formation of ulcers in the future.

Cancer of the stomach and infantile hypertrophic stenosis of the pylorus are also considered from their surgical aspect. The author has taken great trouble in obtaining the after-history of a large number of gastric cases operated upon by himself and other surgeons, the result being a series of tables of cases which add to the interest of the book.

In *Spinal Curvatures*, by Heather Bigg, F.R.C.S.Ed. (J. & A. Churchill, London), the form chiefly discussed is lateral curvature. The book is an uncompromising assertion of the necessity of mechanical support in all cases. After an historical retrospect, the author describes the evolution of the corset-like appliance in the hands of his grandfather, his father, and himself, and the method of making and fitting it. The framework of this appliance is of tempered steel: it firmly grasps the pelvis, supports the axillæ by crutch-like armpieces, is laced tightly across the abnormal prominences of the deformed thorax, and is left loose over the abnormal recesses. The efficacy of any of the "gymnastic" methods is absolutely denied; and it seems strange that the author should refuse to accept methods of strengthening the muscles even as an adjunct to his own treatment. This is one of the few books in which the ordinary corset is defended as beneficial for healthy women. Despite the author's wide experience of lateral curvature and the good results which he reports, it sounds presumptuous to apply to his methods such terms as "marvellous," "perfect," and "infallible." Had there been omitted some needless repetition, and a good deal of illogical argument and rather undignified personal abuse of opponents, the thoughtful and valuable suggestions in the book would be more readily appreciated by the reader.

The Golden Rules of Medical Evidence, by Stanley B. Atkinson, M.B., Barrister-at-Law (John Wright & Co., Bristol), contains many useful hints to the medical witness. It is written by one who is conversant with the many pitfalls which beset the inexperienced in the Coroner's Court and higher judicial tribunals, and we can heartily endorse most of the advice submitted. The paragraphs are crisp and full of epigrams, which enforce the lesson and fix themselves in the reader's memory; such as, for example, "Do right and don't write—then fear nothing"; "disagree without being disagreeable"; "a large experience is not all experience."

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Dechlorination, and the Relation of Chloride Retention to Dropsy and Uræmia.

The effect of deprivation of salt, or dechlorination, as it is called, on various forms of œdema, has attracted a great deal of attention of late, particularly in France, and Widal and Javal's monograph ("La cure de déchloruration," Paris, 1906) is a welcome contribution to a subject the literature of which is rapidly assuming rather alarming proportions.

As a preliminary to considering the question of a salt-free diet, the authors discuss the rôle of sodium chloride in the organism under normal circumstances. Salt is one of the most widely spread minerals, and every cell of our bodies is bathed in a saline fluid. It is naturally present in our food, but, not contented with this, most races of mankind and many animals add it as a condiment. The esteem in which salt has always been held, and the importance ascribed to it, is shown by such usages as the salt tax of India and the *gabelle* of the *ancien régime*, the payment of wages in salt, and many other similar customs. The contention that added salt is necessary for the maintenance of health is merely a traditional assumption, as is proved by the fact that in the lower stages of culture, among nomadic tribes, salt is not used, while, when the agricultural stage is reached, its employment becomes general. Flesh-eating men and animals have, on the whole, less tendency to add salt than those who subsist on cereals. The evidence is against salt-eating being due to an innate craving, and in favour of abstinence from salt, beyond what is naturally contained in the food, being compatible with perfect health and vigour. The bulk of the salt ingested is eliminated in the urine, the amount excreted by the bowel and skin being negligible. On a diet containing the average amount of added salt, about 10 to 15 grms. is eliminated daily. This amount, however, does not represent the daily requirement of salt; in conditions of fasting the quantity excreted is only 0·66 grms. per diem, which may therefore be looked upon as the minimum needed by the tissues daily.

Experimentally, a mixed diet containing only from 1·5 to 2 grms. of salt is found amply sufficient to sustain health; nor does any of the inconvenience—albuminuria, alterations in metabolism, etc.—alleged to follow deficiency of salt, take place. All that happens is that the elimination of chloride falls, but the quantity ingested is enough to compensate for the daily loss. Since the average daily amount of added salt is from 15 to 20 grms., there is a wide range on which we can operate in producing dechlorination.

Chloride equilibrium of the normal organism.—Normally, a state of chloride equilibrium exists, the amount excreted corresponding with that ingested, and the quantity in the tissues remaining constant. If a full dose of salt be given to a man on a fixed diet, there is increased elimination until all has been got rid of; should dechlorination have been previously resorted to, a certain amount is retained in the tissues to replace that which they have lost.

Physiological variations of chlorination and hydration.—Normally, there is a state of equilibrium between the chlorination and hydration of the body. If a healthy man be placed on a fixed diet as regards food and water, and then has the amount of salt in his diet changed suddenly, it is found that his weight undergoes corresponding changes. In an exact observation of this kind on a dechlorinated patient, the addition of 15 grms. of salt daily led to a gain in weight after three days of 1750 grms.; there was retention of chloride equivalent to the previous loss through dechlorination, and thereafter chloride equilibrium was re-established. Thus, parallel with chlorination, hydration of the body took place. Such variations in the fluid of the body are seen in the rapid loss of weight which takes place during the first few days of some obesity "cures"; they serve to maintain the molecular concentration of the tissue fluids at a constant level. On an average, 12 grms. of salt, and from 1·5 to 2 kilos. of water, are the "floating quantities" which a normal subject gains or loses during the transition from a chloride-free to an ordinary diet, or *vice versâ*. So urgent is the physiological demand for salt and water equilibrium, that the amount of salt absorbed depends on the quantity of fluid ingested, and *vice versâ*. Polydipsia alone does not increase the chloride elimination, nor does diminished intake of water alone cause dehydration; the least concentration of the tissue juices produces an irresistible thirst.

Renal retention of chlorides.—In many forms of nephritis the kidneys are more or less impermeable to chlorides, which are, as a consequence, retained in the body. The action of the salt retained in producing œdema, and, conversely, the effect of dechlorination in bringing about the disappearance of dropsy, can often be demonstrated with precision. In studying a case in this way, the first thing necessary is to determine the balance between ingestion and excretion of chloride and water, noting the amount of urine and its content of chloride, while estimating the quantity of chloride and water consumed. This MM. Widal and Javal did for a period of seventy-two days in a case of parenchymatous nephritis. Nine times they changed the diet, giving four periods of chlorination and five of dechlorination. Hydration and dehydration of the tissues (estimated by body weight) coincided with a chloride-containing and a chloride-free diet respectively. Twice they pushed hydration until œdema appeared. Visible œdema is an evidence of advanced hydration. In a patient suffering from Bright's disease, there is, between the degree of hydration which is normal and the occurrence of œdema, a period of progressively increasing hydration (shown by rising weight), which Widal and Javal call the "stage of pre-œdema." Thus in the patient in question the weight varied between 55 and 66 kilos. At the moment when, during the rise in weight on a salt-containing diet, 62 kilos. was reached, œdema appeared; conversely, during the fall under a salt-free diet the œdema vanished when this figure was passed. The patient, therefore, tolerated a hydration of 6 kilos. without becoming anasarcous. It is a common experience to find the appearance of œdema preceded by a gain in weight of about this amount. In studying the progress of a case of dropsy, careful daily weighing under strictly comparable conditions—*e.g.* on rising in the morning, and after emptying the bladder—is of the greatest value. If accurately measured, the weight curve is as good an index of chloride retention and elimination as its quantitative estimation in the urine, and this is a matter of great practical moment. Apparent anasarca is far less dangerous than dropsy of the internal organs, and impending œdema of deep-seated viscera, which may give rise to serious symptoms, can readily be detected by the scales. Many of these symptoms have been included in the clinical picture of uræmia—for example, vomiting and diarrhœa (which are nature's attempt to eliminate salt), headache, eclampsia, Cheyne-Stokes breathing, and dyspnœa—but for them the term *chloruræmia* is proposed. All of them have been observed to disappear rapidly along with a fall in weight following dechlorination. In some, but not all cases, the albumin curve runs parallel to that of the hydration; when this occurs it shows that the albuminuria was due in part to the œdema which the kidney shared with the other viscera. Thus dechlorination exerts a favourable action on albuminuria, as well as the other symptoms of Bright's disease, while Widal and Javal have not found that the amount of proteid consumed makes much difference one way or another. Moreover, in nephritis a vicious circle is apt to be set up, and a kidney which can still eliminate a small quantity of salt may lose even that limited power of excretion by becoming œdematous. In a nephritic patient, for instance, who was in a state of chloride equilibrium when his food contained 3 grms. of salt daily, the addition of 5 grms. of salt, instead of increasing the quantity excreted, reduced it to 1 to 2 grms., while simultaneously the albuminuria reappeared and the weight rose. The hydration of the kidney here had excited albuminuria, and augmented the impermeability of the organ to chlorides. Except in advanced cases, the impermeability, however, is but relative: as a rule, the kidney can eliminate some salt, and if the amount taken be below this limit, retention does not follow. Milk contains from 0·15 to 0·2 per cent. of salt; hence on a milk diet the daily ration (3 to 3½ litres) contains about 5·5 grms. Many cases of nephritis, however, cannot deal with more than 2 grms.; hence an ordinary diet, free from added salt, which contains an average of 1·5 grm., is better tolerated. Dechlorination is more than a symptomatic treatment; as improvement occurs the degree of permeability to chlorides rises, and larger and larger quantities of salts are tolerated. Dechlorination acts extremely quickly in some cases; but in advanced nephritis, where there is almost absolute impermeability of the kidneys to chloride, dehydration may proceed very slowly; in these cases, diuretics, particularly theobromine, are a valuable adjuvant. Occasionally, during the resorption of the œdema, various symptoms occur; the principal of these are convulsions and other nervous symptoms, and dyspnœa, with hæmoptysis. These may last for several days; their occurrence is exceptional; they are always recovered from.

Dissociation of renal permeability to chlorides and urea.—Both chlorides and urea may be retained in nephritis, but in many cases it is found that the two functions are not equally affected. In the parenchymatous form, with retention of chlorides, the urea is often excreted freely, while in surgical kidney the reverse takes place. Accumulation of urea in the body differs from that of chlorides in some respects; the urea remains in the blood, and chlorides diffuse through the tissues. Estimation of the urea in the blood proves that its quantity bears no relation to the amount of œdema. The percentage of urea present in the blood, however, shows whether "uræmic" symptoms are due to it or to retention of chlorides. If it is below 1 grm. per litre, the toxæmia is caused by chlorides; if 3 to 4 grms. per litre, probably by urea. From the fact that the urea is retained in the blood and does not diffuse through the tissues, the molecular concentration of the blood rises, and its freezing-point falls. It is found that, speaking generally, $\delta = 0{\cdot}59^\circ$ or more is a sign of retention of azotised substances. In retention of chlorides, on the other hand, the passage of the salt into the tissues and the occurrence of dropsy prevents the molecular concentration of the tissue juices or blood rising. Urea tends to accumulate only to a degree proportionate to the impermeability of the kidneys; after this is reached, the diuretic action (?) of the urea overcomes the resistance of the renal epithelium. The chief signs of azotæmia are anorexia, gastro-intestinal symptoms, prostration, and torpor.

Dechlorination has been found of service in dropsical conditions other than those due to kidney disease. In cardiac affections, dechlorination is often followed by disappearance of œdema. Here it must be remembered that the dropsical accumulations are caused by the stasis, in the tissues, of salt, which attracts to itself water. When once the power of the heart is restored, chlorides are again well tolerated. Dechlorination has also been employed in ascites, phlegmasia, skin diseases with exudation, and glaucoma.

Practice of dechlorination.—In commencing treatment, the patient should be weighed, and put on a diet containing no added salt. If a purely milk diet be selected, salt is calculated as being present to the extent of 1·6 grm. per litre; an average mixed diet for one day contains only 1·5 grm. of natural salt. Dechlorination and dehydration take place most quickly when the patient is strictly confined to bed. As a rule, progress is steady; but the rapidity with which weight is lost differs widely in individual cases. One patient loses 28 kilos. in seventeen days; another will require six weeks gradually to get rid of 12 or 13 kilos. of water. It is very important to note the exact body weight at which visible œdema disappears. As soon as dehydration is complete and the weight has become stationary, endeavour by giving small quantities of salt to gauge the permeability of the kidneys. Begin with 3 grms. daily, and if the weight does not rise, and if the chloride balance remains in equilibrium, slowly increase. Should the œdema not entirely disappear in spite of dechlorination, drainage, diaphoretics, and diuretics (especially theobromine) should be used.

Composition of a salt-free diet.—Ordinary bread contains from 0·8 to 1 per cent. of salt; it must, therefore, be baked without added salt, and then contains only about 0·07 per cent. This is the only aliment requiring special fabrication; it suffices to cook the others without adding salt. The dietary may be drawn from among the following:—Red and white meat of any kind, eggs, fresh-water fish, fresh butter, cream, potatoes, vegetables, farinaceæ such as rice and tapioca, fruit, pastry baked without salt or salt butter, and, to a limited extent, milk. Beverages of all kinds, except certain saline mineral waters, are allowed. The following articles are to be avoided:—Salt-water fish, cheese, nearly all forms of smoked, salted, or otherwise preserved meat; fish, vegetables, etc.; hams, sausages, oysters, and soups. Widal's usual instructions are that the patient may have from 100 to 200 grms. of fresh meat daily, and farinaceæ, sweets, fruit, etc., as the appetite demands. The monograph contains a number of useful details for rendering such a diet palatable.

Analyses of a number of food-substances in common use, as regards the amount of sodium chloride they contain, will be found in a paper by Tischler (*Therap. Monatsh.*, Berlin, 1906, April, and *Deutsche med. Ztg.*, Berlin, 1906, July 9); it confirms the general rules laid down above.

SURGERY.

UNDER THE CHARGE OF

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Tumours of the Carotid Gland.

Two important contributions to the literature of this subject have recently emanated from the Jefferson Medical College, Philadelphia, one by W. W. Keen and John Funke (*Journ. Am. Med. Assoc.*, Chicago, 1906, August 18), the other by J. C. Da Costa (*Ann. Surg.*, Phila., 1906, September). Each paper is based upon a case operated on by the writer, and as the two papers are strikingly similar we may refer to them together. It would appear that not more than thirty cases of operations for tumours of the carotid gland are on record. In the first paper quoted above, abstracts of these cases are given, and in both the condition is illustrated. The carotid gland under normal conditions is about the size of a grain of corn, and lies to the posterior aspect of the bifurcation of the carotid artery. It is not always present, and its function is unknown. In seventeen of the twenty-seven cases, the tumour was first discovered between the ages of 13 and 35; in seven between 36 and 50; and only in two after 50. Fourteen of the patients were males, and thirteen females. When first observed, the growth is usually about the size of an almond, and of the same shape. It is moderately firm and elastic, but may be so soft as to simulate a lipoma. It increases in size slowly and gradually for a time, and then may grow more rapidly. When exposed, it is found to have a definite capsule, and to present the general appearance of a goitre. Its relation to the vessels, however, is characteristic. As the tumour grows it envelopes the common carotid and its branches, and becomes adherent to the internal jugular vein. So intimate is the connection with the vessels, that in eighteen out of the twenty-seven cases the carotids have had to be ligated during the removal of the growth, and the jugular vein had to be tied in thirteen cases. In its growth the tumour comes to implicate also the large nerves of the neck—the vagus and its recurrent branch, the hypoglossal, the lingual, and the cervical sympathetic having each been divided during the removal in a number of cases. The adjacent lymphatic glands are frequently, but not always, enlarged. The tumour is to be classed with the endotheliomata.

The growth gives rise to few symptoms, and in the great majority of cases the surgeon is consulted on account of the disfigurement resulting from the presence of the swelling in the neck. The physical signs are: the ovoid, smooth, or slightly lobulated swelling at the level of the carotid bifurcation, gradually extending upwards rather than downwards; as it lies under the sterno-mastoid, its posterior border is not always clearly defined. It is movable to some extent from side to side, but not up and down. The skin is free of the tumour, and is not discoloured. There is a transmitted pulsation in the swelling, but no expansion.

The diagnosis has to be made from—lymphoma, adenoma, tuberculous glands, sarcoma, and carcinoma. In one case lipoma was diagnosed. In the majority of cases the correct diagnosis has only been made after exposing the tumour and observing its relations to the vessels. The importance of arriving at an accurate diagnosis is evident from the fact that the mortality from the operation is about 27 per cent., and the operation has nearly always been done merely for cosmetic purposes. Those who have had experience of the condition, including the authors of the papers before us, are agreed that the operation is only justifiable when the growth is rapid and when there is evidence that it is malignant in nature.

A series of illustrations of these tumours is published in the New Sydenham Society's "Atlas of Illustrations," Nos. XVIII. and XIX., 1906, under the name of the "Potato-like Tumour of the Neck."

Thymus Stenosis of the Air Passages and Thymus Death.

There has recently been some discussion on the subject of thymus death (*Centralbl. f. Chir.*, Leipzig, 1906, July 14). Paltauf believes that thymus death occurs in patients who are of a lymphatic constitution, and who possess a low resisting power; at the same time there may be a large thymus present without the patient exhibiting any of the signs of the status lymphaticus. It was shown long ago by Astley Cooper that a large thymus may give rise to characteristic pressure effects in the mediastinal space. Little is known regarding the physiology of the thymus gland, but it would appear that it fulfils some important function during intra-uterine life. König suggests that it is necessary for nutrition, especially of the skeleton. Anatomically, the gland consists of two symmetrical lobes, enclosed in a firm capsule, the anterior part of which is continued laterally into the sheath of the great vessels, and the posterior part into the pre-tracheal fascia. The capsule is connected also with the upper part of the sternum, and with the pericardium and vessels in the mediastinum. The left vagus and recurrent laryngeal nerves are very closely related to the gland, and near the outer wall of the capsule run the phrenic nerves. The gland itself extends downwards like a tongue to the pericardium; it covers the innominate artery, the left innominate vein, and pushes itself into the space between the innominate artery and the right carotid on the one side and the left carotid in the other. It thus comes to lie upon the trachea.

The proof of narrowing of the air passage by a large thymus is that in about twenty-eight post-mortem examinations pressure marks have been found on the trachea; and five reports of operations on the thymus tell of pressure effects having been evident. Neither the weight of the gland alone, nor its size, is the all-important factor. A large, flat gland may cause no symptoms, while a short, thick one may cause severe symptoms. In the newly-born, the part of the trachea where the innominate artery crosses it is that most likely to be pressed upon. Sometimes the trachea is flattened from before backwards, sometimes from side to side. In some instances the pressure is on one or other of the large bronchi; and in one case the gullet was compressed as well as the trachea.

The normal thymus descends into the thorax with each inspiration, and rises again with expiration, and the more pronounced the respiratory movements, the greater is the movement of the thymus. In children with a large thymus, a small, soft swelling may sometimes be recognised in the episternal region during expiration.

In thymus-stenosis it is only inspiration that is interfered with, the gland acting as a sort of valve which is sucked in during inspiration, while in expiration it is displaced out of the thorax, and so the organs are freed from pressure. When symptoms of stenosis are present, by simply pulling out the gland by making traction on its capsule and fixing it by stitches, they may be made to disappear in some cases, but in others the gland may be so fixed against the trachea that simple traction on it has no influence.

Another form of disturbed respiration due to a large thymus is met with. It is of sudden onset, and may pass off quickly, or may rapidly lead to death from suffocation. It is difficult to explain this form, but it is believed to be due to some cause which suddenly narrows the mediastinal space. The attack may be determined by a certain attitude of the body. If we suppose that a large thymus has begun to compress the air passage, the child, in its efforts to obtain more air, will raise its head, and if it exaggerates this attitude and bends the head backwards, the mediastinal space will be narrowed by the lordotic projection of the cervical and upper dorsal vertebræ. This attitude has been observed in cases of thymus death. The thymus must be capable of rapid increase in size, for example, as a result of interference with the venous outflow from the organ.

Stenosis of the trachea from thymus pressure may occur soon after birth, and cause rapid death. In some cases there is a slight inspiratory drawing in of the episternum, and if the child is restless there is inspiratory stridor and cyanosis. In older children the shortness of breath may occur in recurrent attacks, with complete immunity between. The child may die in any one of these attacks.

Thyroid stenosis is such a dangerous disease, that even after a first attack recourse should be had to immediate operation. A vertical incision is made in the episternum, and the dissection carried down between the muscles to the pre-tracheal space. The gland is recognised to be raised with each expiration; its capsule is seized and pulled upon. If the breathing does not at once become free, the capsule is laid open and the gland shelled out. It is very seldom necessary to remove the manubrium. The operation is comparatively easy, and is almost always successful (Rehn).

OBSTETRICS AND GYNÆCOLOGY.

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Chorea Gravidarum.

A. Martin (*Deutsche med. Wchnschr.*, Leipzig, 1906, No. 31) regards chorea during pregnancy as a very serious complication. From a considerable experience of this condition, he has only in three cases interrupted the course of pregnancy in the interest of the mother, and in all successfully. He has met with two cases where chorea recurred in successive pregnancies. In the first, all symptoms of chorea disappeared about the fourth day after spontaneous delivery. In the second, premature labour was induced at the sixth month of the second pregnancy on account of the severity of endocarditis. With regard to treatment, Martin has not had good results with morphine and chloral, but recommends bromides, especially during the later months of pregnancy. He gives bromide of sodium and ammonium in 30-gr. doses, with drachm doses of bromide of magnesium. In mild cases iron and arsenic may be tried, and only in exceptionally severe cases does he recommend the induction of premature labour.

Abdominal Hysterectomy for Cancer of the Cervix Uteri.

Lapointe (*Clin. Opht.*, 1906, August 24) is a strong advocate of Wertheim's operation for removing uterus, cellular tissue, and broad ligaments, with extirpation of the lumbar and pelvic glands. He favours preliminary extirpation of the affected cervix with the thermo-cautery. He describes his method of isolating and preserving the ureter during the dissection of the broad ligaments. In advanced cases, where the ureter is so involved in cancerous disease as to render its isolation impossible, he resects it, or removes the corresponding kidney. In order to prevent peritoneal infection, the uterus is pushed down and removed through the vagina, the peritoneum being closed from above. All oozing must be carefully stopped before closing the abdomen, as a precaution against sepsis.

Pelvic Displacement and Pain.

W. Hey Groves (*Bristol Med. Chir. Journ.*, 1906, June) believes the pelvic viscera to be chiefly supported by the underlying pelvic floor, composed mainly of the levatores ani and fascia. This floor is strong at its circumference but weak in the median line. Displacements of the uterus, bladder, and vagina depend on rupture or stretching of the median raphé, repair of the latter constituting the rational treatment. When the pelvic floor fails to support the viscera, the latter hang on the peritoneal ligaments, and cause pain by dragging on ovaries, tubes, and pelvic nerves. The various points referred to in this paper are illustrated by sketches.

Exfoliative Dermatitis in the New-born Infant.

Baker (*N.Y. Med. Journ.*, 1906, June) describes a case of this rare condition. It generally appears suddenly, after the end of the first week, as a diffuse erythema. Exfoliation begins from thirty-six to forty-eight hours later. Desquamation takes place very rapidly, quickly followed by regeneration. Relapses, when they do occur, are usually mild. Although the exact cause is unknown, the writer thinks that infection of the umbilical stump favours the idea that the affection is pyæmic. In the case reported by Baker there were exuberant granulations and an infection of the stump of the cord. The treatment consists in the application of a bland ointment. The rate of mortality, as taken from a collection of reported cases, is about 50 per cent.

Typhoid Fever during Pregnancy.

Foulkrod (*Am. Journ. Obst.*, N.Y., 1906, August) reports five cases—(1) Multipara, æt. 30; pregnant at fourth month. Widal test gave positive result. Discharged well on fortieth day. Aborted four days later. (2) Primipara, æt. 19; seven months pregnant. Widal test gave positive result. Temperature normal on the twenty-eighth day. Went to full time. (3) Primipara, æt. 22; seventh month of pregnancy. Widal's test positive. Temperature never above 101°. Went to term. (4) Primipara, æt. 19. Normally confined 14th July 1903.

In February 1903 had severe attack of typhoid fever, this case being one of pregnancy occurring during the early days of convalescence from typhoid. (5) Patient had severe attack of typhoid, with relapse. Some weeks after her discharge from hospital was treated for amenorrhœa. At the fourth month of pregnancy abortion occurred without any exciting cause. The author concludes that in a typhoid infection occurring before the fourth month this will prove the predominant infection, and abortion will occur in about 75 per cent. of the cases. When, however, the infection occurs later in pregnancy, the latter will prove the stronger infection, the fever will be greatly modified, and, as a rule, pregnancy goes on to full time.

Pyelonephritis complicating Pregnancy.

Rudaux (*Clin. Opht.*, 1906, August) believes this to be a frequent complication of pregnancy. It occurs especially in young primiparæ, and generally affects the right side. It manifests itself about the fifth to sixth month. The onset is insidious, and, unless the urine is from time to time examined, may not be suspected till constitutional symptoms appear. The patient may have a rigor; the temperature is high; there is frequently vomiting. On examination, the right lumbar region is generally tender, the pain radiating down the thigh. Per vaginam, pressure on the ureter causes pain. The urine contains blood, pus, and casts. The reaction is acid, and the quantity generally decreased. It is important to distinguish cystitis from pyelonephritis. In the former there is frequent and painful micturition; while in the latter, pressure over the lumbar region nearly always elicits tenderness.

A Rare Type of the Toxæmia of Pregnancy.

Lobenstine (*Bull. Lying-in Hosp. N.Y.*, 1906, June) reports a case where the essential manifestations of the toxæmia were coma and marked rigidity of the neck. Patient, multipara, seven months pregnant. Five days before admission to hospital was seized with severe headache and vomiting. Three days later she had marked stiffness and pain in the neck, and became comatose, although still able to swallow. She could only answer questions in a dazed manner. There was slight œdema of the feet, photophobia, and external strabismus. The urine contained a trace of albumin, 1 per cent. urea, and a few hyaline casts. She made a complete recovery three weeks after admission to hospital. Lobenstine regards the case as one of a very unusual type, in which the general condition remained relatively good and yet the patient showed for many days marked meningeal irritation. She was comatose for seven days, and the rigidity of the neck was as great as in the average case of cerebro-spinal meningitis.

THERAPEUTICS.

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The Over-Treatment of Syphilis.

Geo. H. Fox (*Therap. Gaz.*, Detroit, 1906, August) has an interesting and outspoken article, in which he deals with the vexed question of the over-treatment of syphilis. He thinks this over-treatment is one of the commonest of therapeutic errors. It is forgotten that syphilis in many cases runs a very mild course. In many cases the treatment is actually worse than the disease, so far as the patient is concerned. The average patient, with careful attention to his general health, suffers very little inconvenience from syphilis. But such a patient's condition can be made serious if his mind is allowed to dwell upon the possible evils that may arise, if his gastro-intestinal functions are disturbed by too large doses, and his time and comfort banished by unnecessary baths, inunctions, and injections. The popular idea of syphilis is based largely on tradition. The student is taught to treat syphilis energetically. He rarely is told that syphilis may run a benignant course. They underestimate the healing power of nature, and ignore the fact that, as a rule, the best therapeutic results are obtained by combining suitable hygienic measures with moderate medication. For the anti-syphilitic remedies to produce their brilliant action, the hygienic condition of the patient must be satisfactory. To treat the disease alone and ignore the patient is wrong. The remarkable variation in the severity of the disease must be borne in mind. Certain patients show symptoms which relapse during a number of years: these of course require more treatment than milder cases, and no fixed rule can be laid down which will apply to all. In the acute exanthematous diseases the duration of treatment is always based upon the exigencies of the individual case, and the same plan should be used in syphilis, a chronic exanthematous disease. The teaching that every case, whether mild or severe, should be treated for a certain length of time, is illogical and often harmful. If it does not injure the patient's health, it involves at least a waste of good medicine. He does not agree that less energetic treatment intensifies the danger of subsequent severe tertiary symptoms. In many cases the very opposite is seen. So-called obstinate cases of syphilis, which prove refractory to increasing doses of anti-syphilitic remedies, often improve wonderfully if the medication is entirely stopped for a few weeks, and the patient's general health is built up. Then moderate amounts of the drug will be found to act like a charm. The error of treating the results of the disease with anti-syphilitic measures is common: thus scars and saddlenoses cannot be improved by medication. In claiming that syphilis is too often over-treated, and that the general condition of the patient is not given the consideration it requires, Fox by no means underrates the value of mercury and iodides in controlling the symptoms of the disease and in materially shortening its duration. They are among the most brilliant remedies in the pharmacopœia. But he very pertinently points out that, looking back over a number of years, the tendency has always been to reduce the amount of the dose. In old days severe salivation was aimed at, then later it was reduced to mild salivation. Nowadays the object is to avoid any salivation at all, and yet the present results are as good as in former days.

The Value of Massive Doses of the Salicylates in the Diagnosis and Treatment of Acute Articular Rheumatism.

During the past six years, in the treatment of acute rheumatic fever at the Lakeside Hospital, Cleveland, the tendency has been to a progressive increase in the dosage of sodium salicylate employed. Beginning with 10 grs. every two hours or 15 grs. every four hours, the amount used has been increased to 10, 15, or even 20 grs. hourly, in the endeavour to secure the drug effect as promptly as possible. The present routine consists in giving sodium salicylate every hour, if the patient is awake, in doses varying from 10 to 20 grs., until toxic symptoms appear, such as deafness or tinnitus. The drug is then stopped, but is resumed in doses of 10 to 20 grs. every two to four hours, when the toxic symptoms have disappeared. The amount of salicylate required to produce symptoms of its full effect has varied from 75 to 360 grs., and in a series of seventy-four cases averaged 200 grs. The massive dose is well borne, as a rule, without nausea, vomiting, or depression, and the relief of pain is rapid. The fall of the temperature is very rapid. A composite chart of the whole series of cases shows that the temperature reaches subnormal at the end of thirty-six hours. Relief from pain is very striking. Analysis shows that the average patient is completely free from pain by the fourth day. The total disappearance of swelling is seen on the third day, on an average. In only four out of seventy-four patients was there involvement of a fresh joint after the treatment was commenced. The heart is apparently not depressed by these massive doses, and cardiac complications seem to be lessened. Clarke considers that there is a certain element of danger in using these massive doses, but with proper care and attention to the development of early symptoms of toxic action this danger is not great. Immediately on the appearance of any toxic symptoms this drug should be stopped. The main objection to the use of the massive dose is found to be the difficulty of keeping the patients at rest after the third day. To some extent the curative action can be utilised for diagnostic purposes. The first point is that the true rheumatic can stand much larger amounts of the drug without becoming affected, while patients suffering from other forms of arthritis become toxic on much smaller doses. The true rheumatic can tolerate from 150 to 300 grs., while gonococcic cases averaged only 131 grs. The second point is the relief from pain. Unless the patient is free from pain by the end of forty-eight hours, the diagnosis of true rheumatism must be questioned.—*Am. Journ. Med. Sc.*, Phila., 1906, September.

Tuberculous Meningitis.

Riebold reports an interesting case of tuberculous meningitis, in which repeated tapping of the spinal canal resulted in a cure. The symptoms showed that the case was of a fairly severe type, and the diagnosis was made absolutely certain by finding tubercle bacilli in the fluid removed and by inoculation of guinea-pigs. For nine days in succession spinal puncture was performed daily, and during the next three weeks it was done less frequently. In all, twenty-four tappings were done, and 574 c.c. of cerebro-spinal fluid was removed. In general terms it may be said that after each puncture the patient was relieved. The pulse fell, but still remained somewhat frequent. General improvement was indicated by relief of headache and quiet sleep. The patient gradually recovered, and has remained well for seven months. As regards the interval at which the tapping should be performed, it is impossible to frame any fixed rule. It depends upon the rapidity with which the fluid reaccumulates; but so long as the pressure is greater than 25 to 30 c.c. of water, and in order to reduce this pressure to 10 or 12 c.c. the removal of 25 to 30 c.c. or more of cerebro-spinal fluid is necessary, then spinal puncture should be employed daily. It is possible that by employing this method a few cases at least of tuberculous meningitis may be saved.—*München. med. Wchnschr.*, 1906..

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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A Study of Two Cases of Syringomyelia.

Hutchinson (*Bull. Ayer Clin. Lab. Penna. Hosp.*, 1906, June) gives particulars of two cases of syringomyelia, which he makes the basis for an excellent discussion of certain features in the pathology of the disease. The essential feature in syringomyelia, which, as it is now conceived, is not a distinct pathological entity, is the presence in the grey matter of the cord, usually posterior to the central canal, of one or more cavities, showing evidences of progressive development and associated with glia hyperplasia, and with changes in the neighbouring blood vessels. Many authorities include hydromyelias (a distension of the central canal) among the syringomyelias because the process leading to the cavity formation is sometimes identical in both. The following is a short résumé of the author's cases.

Case 1.—Man, æt. 20, contracted syphilis. Fifteen years later, headaches, vomiting, and convulsions appeared. The convulsions affected both sides of the body, and were accompanied by unconsciousness. There was complete bilateral hemianopsia, and the opthalmoscope revealed choked discs and retinal hæmorrhages. Great improvement followed anti-syphilitic treatment, but in less than a year later the convulsions returned, and from the lower border of the ribs downwards, first anæsthesia then paraplegia developed, and remained until his death, fourteen years later. The post-mortem findings were: In the upper thoracic region a large cyst in the membranes, anterior to the spinal cord, compressing and causing complete degeneration of the latter, and ending below in a cul-de-sac; great thickening and adhesion of the membranes at and below this point. Lower in the end, but confined to the thoracic region, there were several syringomyelic cavities of varying extent, one of them, the lowest, occupying the entire centre of the cord, having the cord round about it as a narrow ring. A moderate internal hydrocephalus was present, and degenerations were found in the optic nerves, especially the left, and in the inner portion of the right optic tract. An old cyst was found in the corpus striatum of one side, and consequent degeneration of some of the pyramidal fibres below. The spinal cord traced downward, showed more and more evidences of compression, until in the region of the cyst it appeared as a crescent-shaped necrotic mass of tissues surrounded by dense fibrous tissue. Below this point it expanded again, to be occupied, however, by a series of cavities, the last and longest ending before the lumbar region was reached. They occupied the posterior horns of grey matter. The lumbar region, except for retrograde degenerations in the posterior columns, appeared normal. A distinct central canal was present in the upper cervical region, though it was surrounded by a dense mass of cells; below this point, throughout the cord, only a mass of cells, without lumen, occupying the site of the central canal, were seen.

Case 2.—Woman, æt. 67, partially paralysed on right side on admission. Same kind of attack fourteen years before. Knee-jerk on right side absent; other reflexes, including pupillary, present. On day of death, a year later, knee-jerks on both sides absent, wasting of thenar and hypothenar eminences, very weak grip in right hand. Eye movements normal, and no paralysis of facial muscles. Incontinence of urine and fæces. *Post-mortem findings were*—A cavity of small size, situated in posterior half of the spinal cord, in the thoracic region. Above, this cavity appeared to originate in a rarefaction and absorption of the nerve tissues of the posterior columnus; lower, where the cavity was situated somewhat more anteriorly, its anterior and posterior walls were seen to be lined by epithelium, while its two lateral extremities ended in attenuated nervous tissue, rich in thick-walled blood vessels. The membranes of the cord were greatly thickened, this being most marked at a level slightly above the cavity in the cord. The blood vessels in the cord and membranes throughout showed thickened walls, and about some of them a slight round cell infiltration was seen.

In Case 1, syphilis was the cause of the thickening of the membranes which had become adherent to one another in the upper thoracic region, consequently the spaces in meninges above were no longer in communication with those below, and the flow of cerebro-spinal fluid was prevented. This fact would account for the cyst-like formation in the meninges, and for the great compression of the cord above this point, and for the hydrocephalus. The consequent bulging of the floor of the third ventricle, with pressure on the optic tracts and chiasma, would account for the degenerations in the optic tracts and nerves. There was probably no connection between the pressure caused by the meningeal cyst in the thoracic regions and the syringomyelic cavities in the cord below, but the degenerations in the tracts were such as would be expected from a complete destruction of the cord above. The epithelial cells of the choroid plexuses showed a somewhat larger number of intracellular globules than are normally found, probably the result of some toxin in the blood or cerebro-spinal fluid. The mode of origin of the cavities found in the cords in these two cases is not clear. There was certainly more than one process at work. The explanations of such syringomyelic cavity formation hitherto advanced are—(1) Congenital, a faulty closure of the central canal in embryonic life, leaving nests of epithelial cells in the grey matter, which later may proliferate; (2) hæmorrhages; (3) tumours (gliomata and sarcomata) reacting upon the surrounding tissues, and themselves degenerating; (4) changes in the meninges. The congenital abnormalities may be small and remain so throughout life, or they may be stimulated to proliferation and growth either by direct action of circulating toxins upon the cells, or as a compensatory phenomenon following upon destruction and rarefaction of the surrounding tissues. Rarefaction of the peri-ependymal tissue, for instance, due to poor nutrition, may give rise in this way to a hydromyelia. Vetlesan regards the proliferation as a species of genuine tumour formation with extremely slow development. Some consider the glia hyperplasia as a reactive inflammatory process, others as a compensatory growth consequent upon degeneration of white nerve fibres. The rôle of the blood vessels in the production of syringomyelic cavities is important. Traumatic hæmorrhages may cause them, and so may spontaneous hæmorrhages, probably at first small, but later becoming larger, *i.e.* chronically progressive. The reason why the grey matter is most frequently the seat of these hæmorrhages is found in its structure being of a much looser texture than that of the white matter. The theory of Thomas and Hauser requires notice. They think that there is first a multiplication of blood vessels of an inflammatory origin with proliferation of their adventitia and detachment of connective tissue from the same. These strands of connective tissue isolate bits of nervous tissue, which then disappear. Later, as the circulatory trouble increases, not only larger areas of nervous tissue disappear, but the replacing fibrous tissue itself degenerates and disappears. Many authors support the origin of syringomyelic cavities from changes in the meninges, and Hutchinson is inclined to think that his second case comes under this heading. Case 1 may be somewhat similar, as syphilis may cause gliosis of the cord as well as thickening of the membranes. All the cavities had walls of thickened neuroglia, and none were lined by epithelium. Several excellent photographs of sections stained by Weigert's method illustrate the paper.

A Simple Method of making Anaerobic Cultures.

Reuschel (*München. med. Wchnschr.*, 1906, June 19) describes this method, which he claims to be fitted for growing the most sensitive of anaerobes. A test tube is filled two-thirds full of the culture medium, and its open end then fitted with a piece of tightly-fitting thick-walled rubber tubing, which should project a short distance beyond the end of the test tube. This is plugged with cotton-wool, and the whole tube now sterilised in the usual way. After sterilisation is completed, the tube is heated to a temperature sufficient to expel all the air contained in the medium, and is then rapidly cooled. When cool, the medium is inoculated in the usual way. The tube is then sloped so that the upper layers of the medium can be heated to the boiling-point without injuring the organisms in the lower layers. This expels all the air in the upper portion of the tube by means of the water vapour thus produced, which fills it. The rubber tube is now closed with a clamp, and the tube placed in cold water to cool it quickly. The tube is now incubated in the usual way, or kept at room temperature as desired.

A Simplified Method for the Determination of the Quantity of Uric Acid in the Urine.

Kowarski (*Deutsche med. Wchnschr.*, 1906, June 21) claims that the following method is simpler and more rapid than those in use, and equally accurate. Ten c.c. of urine + 2 or 3 drops of ammonia + 3 grms. of powdered ammonium chloride are placed in a centrifuge tube, the mouth of which is closed with a rubber stopper, and the tube shaken until the ammonium chloride has dissolved. The tube is now allowed to stand for two hours, during which time the ammonium urate formed separates. The fluid is then centrifugalised during one or two minutes, and the supernatant fluid poured off. Five drops of concentrated hydrochloric acid are added, and the tube is heated over a small flame. A crystalline deposit of uric acid quickly forms, and the tube is allowed to stand for an hour. The sediment is washed with water and alcohol by means of the centrifuge until the alcohol has a neutral reaction. The sediment is then dissolved in 2 c.c. of hot water, a drop of phenol-phthalein is added, and the hot fluid is titrated with 1–50 normal piperidin solution until a permanent pink colour is obtained. The number of c.c. of piperidin solution used is now multiplied by the factor 3·36, and the result gives the number of mgrms. of uric acid present in the 10 c.c. of urine.

INSANITY.

UNDER THE CHARGE OF

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Myopathy in Epilepsy.

Dr. Onuf, of Sonyea, N.Y., has published (*Journ. Nerv. and Ment. Dis.*, N.Y., 1905, January) a series of six cases of epilepsy presenting special symptoms of muscular affection. These emerged from a study of fifty cases of epilepsy selected from the patients of the Craig Colony for epileptics. Out of these fifty only fourteen answered to the description of idiopathic epilepsy, which it was specially desired to investigate. Of these fourteen, six presented a remarkably uniform series of symptoms, which Onuf refers to the class of myopathies. The symptoms were partly a muscular atrophy, partly a defective muscular action without atrophy, these having a fairly definite distribution, and being manifested by the following symptoms: Wing-like scapulæ, chiefly due to weakness of the trapezius; atrophy of the scapular muscles and, in some, of the deltoid and shoulder muscles; lordosis in the erect position, but disappearing when sitting, due to weakness of the hip extensors. In addition, there was a tendency to pes valgus. In two of the cases there were electrical changes, chiefly in the deltoid muscles, and fibrillary muscular twitchings. These symptoms were not equally prominent in all the cases. The series of symptoms seemed to the author to be best referred to the group of the myopathies, though there were some facts against this. In two cases where the history was fairly complete there was evidence of the family character of the disease. The relation of the disease to epilepsy was remarkable, and not hitherto observed. The conclusion the author draws is that the more carefully cases of so-called idiopathic epilepsy are studied, the less becomes the percentage of those to which the title idiopathic remains justifiable. The possibility of the condition he describes being itself a sequel of epilepsy is considered, but the author does not commit himself one way or another. It is, however, quite certain that some cases of epilepsy develop peculiar muscular symptoms, which may be the consequence of this disease or one superadded to that already existing. Rickets is also referred to as a possible cause of both conditions, and this appears to be quite a feasible explanation.

Excision of Cervical Sympathetic for Epilepsy.

Drs. Spratling and Park relate their experience of excising the cervical sympathetic in three cases of epilepsy (*Journ. Nerv. and Ment. Dis.*, N.Y., 1905, April). In the first place they review the experience of others in the 208 cases already recorded. Out of 122 cases well observed, 6·6 per cent. were cured, 13·9 per cent. "preliminarily" cured, 18·9 per cent. improved, 6·7 per cent. died, while the rest, 54·9 per cent., were not improved. The three cases reported on do not, of course, materially alter these percentages, but they are specially interesting in that the excised tissues were very carefully examined.

Useful details of the surgical procedure are first given. The histories of the cases are then related. One had a special feature in addition to the epilepsy. He suffered from chronic movements of the face, head, and arm on the right side. He had two fits four months after the operation, and up to thirteen months later had no more. He had about one a month before it. The second patient had fits at irregular intervals, about less than one a month. No particulars are given in the third case as to the frequency of the fits, nor is there any statement in this or the preceding one about the effect of the operation on the fits. More details are given about the results of the histological examination of the nerves removed. The changes found were the following: Pigmentation of a number of the ganglion nerve cells. In all the cases at least one cell with double nucleus was found, and in one several of these were present. Degenerative changes in the nerve fibres of the cord and ganglia. In one case there was a focus of inflammation. The significance of these changes is uncertain until more is known of the normal and pathological appearances of this part of the nervous system. It is to be regretted that more particulars are not given as to the results of the operation on the fits.

DEMENTIA PRÆCOX.

ATTENTION may be called to a very good short paper by Dr. Sachs on dementia præcox (*Journ. Nerv. and Ment. Dis.*, N.Y., 1905, June). In discussing the entity of this disease, he lays it down as a fundamental condition that it is justifiable to so regard it only if it helps in the recognition of distinct clinical entities; if it helps to differentiate one form of disease from another, each of the diseases so differentiated having a cause and symptomatology all its own. The morbid conditions underlying it should also in a sense be peculiar to it. This last condition, however, is not possible of fulfilment in the present state of knowledge of the pathology of mental disease. Does the term dementia præcox conform to those conditions? What, it may be asked, is gained by the substitution of this term for the already well-known forms of the insanity of adolescence? Sachs thinks there is not much. The definition of Kraepelin is too wide, and the tendency is to make it wider still. That dementia is a necessary termination is also, he thinks, too sweeping a statement and an unjustifiable confession of failure. He relates cases from his own experience where the diagnosis of dementia præcox would have been made by most persons who use this term, and yet there was no element of dementia about them on their recovery. That term was therefore not warranted. He thinks, however, that the introduction of the term has done good, but that more discrimination is required in distinguishing between the various forms of insanity to which youthful individuals are subject, and that little good can come of grouping widely divergent types under one heading.

Dementia præcox is also the subject of a long paper by Dr. D'Orsay Hecht (*Journ. Nerv. and Ment. Dis.*, N.Y., 1905, November and December). An account is first given of the introduction of the terms hebephrenia, katatonia, and dementia præcox, and the ways in which various forms of these diseases have been classified. The writer expresses admiration of Kraepelin's work, and his essential agreement with the views advanced by the latter. Illustrative cases are also described. The pathological findings of various workers are reviewed in a useful summary. They are acknowledged to be as yet unsatisfactory. Diem's dementia simplex is regarded by him as worthy of note and of further investigation, as it differs from the recognised types of dementia præcox in several important features. If this be so, the process of simplification introduced by Kraepelin is in danger of once more becoming confused.

MENTAL CLINICS IN GERMANY.

In a short but interesting paper (*Journ. Nerv. and Ment. Dis.*, N.Y., 1906, April) Dr. Stewart Paton draws attention to the great benefit that has accrued to the study of mental disease in Germany by the association of psychiatrical clinics with the general hospitals in all the best university towns. Not only is it a great advantage to the patients in that they more willingly and early avail themselves of this means of treatment, but the close affiliation of these clinics to the universities is attended with immense benefit to the medical profession, and not least to the students. As in most departments of work in Germany at the present day, the arrangements are made with scientific thoroughness, and an experience of over forty years shows that these arrangements are not only scientifically sound, but practically economical. Asylums in districts where there are no psychiatric clinics must be constructed and equipped to meet different conditions from those required where this type of hospital exists. In addition, mere high pay will not by itself attract to the field of mental medicine those who are best fitted to engage in original research, and so to advance the general knowledge of that subject. The association with a university and with those engaged in similar work in other departments is found to be a great inducement for men of the right stamp devoting themselves to psychiatry. The experience of Germany should be carefully considered by all those who are interested in the establishment of a psychiatric clinic in connection with the Royal Infirmary in Edinburgh. More especially is this necessary on the part of those upon whom rests the responsibility of deciding this question in one way or the other.

THE MENTAL DISTURBANCES OF ALCOHOLIC NEURITIS.

The association of mental symptoms with alcoholic neuritis is the subject of a long and interesting paper by Dr. J. H. Coriat (*Am. Journ. Insan.*, Utica, 1906, April). The subject is treated in an exhaustive manner not only by a summary of the views of other workers, but also by a description of about twenty cases seen by the author, which form the basis upon which his conclusions rest. The following are the varieties of disorder which he recognises from his study of these cases, and from a review of the literature on the same lines.

(1) The neuritic disturbances may take the form of central or peripheral ocular paralysis. In the former case there is an acute polioencephalitis of the oculo-motor nerve nuclei, and the phenomena presented have then a close relation to the symptoms of delirium tremens and to Korsakow's disease. The associated mental disturbances are caused by involvement of the higher central neurones, and are manifested either by delirium with marked allopsychic disorientation or a fabricating psychosis. (2) There may be the combination of symptoms described by Korsakow—a peripheral neuritis with chronic delirium. (3) A delirious state, strongly resembling delirium tremens, but with a very acute onset. The confusion is usually deeper than in ordinary delirium tremens. (4) A very acute delirium of Korsakow's type, with isolated neuritic symptoms, and progressing rapidly to recovery. (5) A

true delirium tremens, which may shade into a fabricating psychosis. In them recovery is not complete, but there remains a slight degree of mental deterioration. (6) A group of cases having a protracted course, with marked depression, suicidal tendencies, strong religious ideas, great fear and anxiety, with marked hallucinations. At the onset and height of the disease, signs of peripheral neuritis are absent. These cases present a central neuritis as the particular lesion of the disease. (7) There may be a pure acute hallucinosis free from allopsychic disorientation, in which the neuritic pains may form the basis of various delusional interpretations. The peripheral affection may, however, be absent at the outset, but may appear later. Under both conditions the prospects of recovery are favourable. (8) Depressive delirious states with a very rapid course, with marked physical symptoms of a polyneuritis; or there may be a dreamy hallucinatory confusion, but without fabrications or amnesia in either case. (9) A fabricating delirium of an acute type, not resembling delirium tremens, and showing striking features of difference from Korsakow's disease. (10) A group of cases resembling at first an alcoholic dementia, with marked recent memory defect, running a rather slow course, but ending in an almost complete recovery, mental and physical.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF
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ON THE TREATMENT OF SOME AFFECTIONS OF THE NOSE AND THROAT BY RADIUM.

DIONISIO of Turin has for some time had under observation a number of cases of ozæna treated by radium and other forms of light. In a recent publication (*Rev. hebd. de laryngol., etc.*, Bordeaux, 1906, September 15) he shows that the good results obtained have not been of a transitory kind, but must still be regarded as satisfactory after more than two years. He refers to two cases which he had demonstrated as cured in 1904, a girl of 9 years and a young man of 21. Two years later, they remained free from symptoms in spite of the fact that they had ceased to carry out any lavage. The secretion of the nasal mucous membrane was almost normal in quantity and quality, respiration was satisfactorily performed, and the atrophy of the mucous membrane had disappeared. In one of the patients the sense of smell had been recovered. The treatment had been carried on for several months with more than two hundred sittings of two hours each.

Two other patients, a girl of 17 and a man of the same age, showing typical signs of ozæna, in whom treatment was carried out in 1905, were very rapidly cured in about three months. Altogether fifty-four patients suffering from a pronounced form of ozæna had been under the light treatment. In three only there had been no notable modification, but in all the others there was certainly amelioration of both subjective and objective phenomena or a cure. In some of the patients who were regarded as cured there had arisen during an acute cold some fœtor, which, however, disappeared rapidly after washing and after cessation of the cold. In a small number there was a recurrence of the condition, which, however, was readily amenable to further treatment. In the more recent cases cure had been obtained after one hundred séances of an hour each.

Botey has been experimenting with radium in affections of the nose and throat (*Ann. d. mal. de l'oreille, du larynx, etc.*, Paris, 1906, August). By means of a suitable instrument attached to an ordinary forehead band placed upon the patient's head, the radium can be kept in position for the necessary length of time. The patient can read or otherwise interest himself during the séance, the movements of his head in no way affecting the position in which the radium has been placed, head and radium moving together. In this way affections of the nose, mouth, and pharynx may be treated, but when it is considered advisable to apply the treatment to the base of the tongue, epiglottis, or interior of the larynx, the radium must be held in one hand and the laryngoscopic mirror in the other, a method which conduces to the fatigue both of the patient and of the physician.

Amongst the various conditions treated in this way may be mentioned a case of tuberculous ulceration of the centre of the tongue, about the size of a sixpence. Applications of radium were made for thirty minutes every twenty-four hours. After the fourth séance, the sitting was prolonged to forty minutes. After twenty-five exposures the ulcer presented a healthy appearance, and twenty days later it was regarded as healed. There had been no recurrence at the end of three months. Another example may be cited. In a case of lupus of the tip of the nose associated with lupus of the vestibule and anterior end of the inferior turbinated body, daily applications of radium for a period of thirty minutes were carried out. After twelve sittings the ulceration was perfectly cicatrised.

An interesting experiment was made in a case in which the radical mastoid operation had been performed, and where the formation of epithelium over the surface of the bone cavity was delayed. After six sittings under radium, healing had taken place. A layer of gauze covered the surface of the bone during the exposure. A case of tuberculous disease of the larynx was also submitted to treatment by radium. Under the guidance of the laryngoscopic mirror, and under local anæsthesia, nine sittings were given, the epiglottis coming under the influence of the radium. It was necessary every two or three minutes to suspend treatment, as the patient became fatigued; the operator also became weary. In spite of a number of séances, at least fifteen, there was no improvement noticed. In two other cases of tuberculous disease of the larynx, the treatment by radium did not prove satisfactory. Botey considers that radium may be applied not only for fifteen minutes at a sitting, but even for two or three hours daily if it is thought necessary. Radium used in such cavities as the nose, mouth, and ear has its advantages over the X-rays. Its method of application is more simple. Pain and bleeding disappear under its influence. Unfortunately at the present time it is too expensive for general use.

On the Use of "Alypin" as a Local Anæsthetic in Nose and Throat Operations.

Raoult and Pillement briefly refer to their experience with "alypin" as a local anæsthetic (*Arch. internat. de laryngol.*, Paris, 1906, September–October). Local anæsthesia supervenes very rapidly upon its application, and is complete at the end of three minutes. It lasts for a considerable time; 6 to 8 cgrms. suffice for one application. Unlike cocaine, alypin is not a vaso-constrictor, but produces even a slight hyperæmia of the mucous membrane, which becomes red and a little turgescent. This inconvenience, however, can be avoided if one adds 1 or 2 drops of the ordinary adrenalin solution. One thus obtains a vaso-constriction, the mucous membrane becomes less turgescent, and, furthermore, the anæsthesia appears to be more complete and more rapid. Sometimes the slight vaso-dilator property of alypin constitutes a real advantage over cocaine in cases where it is proposed to snare a portion of the inferior turbinated body. As the tissue does not shrink under the anæsthetic, it is more easy to ensnare it. The authors also state that hæmorrhage is less abundant, and stops more rapidly than after the use of cocaine. They have also used it in operations upon the nasal septum, but in laryngeal work they have found it less useful than cocaine. No toxic phenomenon has ever been observed during its use, no acceleration of pulse, no pallor, and no sweating.

The Treatment of Otitis Media by Bier's Congestion Method.

Isemer relates his experiences in twelve cases of middle ear inflammation, eleven of them being acute and one chronic (*Arch. f. Ohrenh.*, Leipzig, 1906, August). The pressure was applied to the neck in a manner similar to that adopted in Bonn by means of an elastic bandage so fixed that the amount of pressure could be easily regulated. The engorgement was regarded as sufficient when the skin of the patient's face presented a slightly cyanosed appearance. The duration of the application varied from twenty to twenty-two hours daily. As the result of his experience, Isemer notes that the treatment of otitis media by Bier's method is not without danger, because by placing confidence in this method one may neglect the timely use of surgical interference, and so bring about a fatal issue. Again, further clinical experience is necessary to differentiate as to what form of inflammation, at what stage of its course is this method of treatment to be adopted, and as to how long the treatment may be carried out before one should proceed to operative interference. There seems to be special danger attached to its use in cases associated with the diplococcus, while of course it is unwarrantable where there is any suspicion of intracranial complication.

PUBLIC HEALTH.

UNDER THE CHARGE OF
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Relation of Dysenteric Bacilli to Potable Water.

An important contribution to our knowledge of this subject is published by Vincent (*Rev. d'hyg.*, Paris, tome xxviii. No. 7), giving the results of experiments he has conducted as to the vitality and persistence of bacilli of the dysenteric type in sterilised water and in waters more or less contaminated. He experimented with *Bacillus dysenteriæ* of the following types, namely, Shiga, Flexner, and Kruse. Portions of growth from a 48-hour agar culture were diluted with sterilised water, and varying quantities of this dilution were added to the waters used for experimental purposes, and from these latter dilutions cultivations were made at regular intervals of time. In sterilised distilled water the bacilli were found dead after the following times at the temperatures stated:

	Temperature, 1° to 4° C.	Temperature, 16° to 20° C.	Temperature, 38° C.
B. Flexner . . .	11 to 18 days	9 to 10 days	5 days
B. Kruse . . .	9 ,, 12 ,,	8 ,,	5 ,,
B. Shiga . . .	9 ,, 15 ,,	6 ,, 7 ,,	4 ,,

In sterilised spring water the bacilli did not survive longer than from nine to sixteen days at 16° to 20° C., and from seven to ten days at 38° C. In the ice-chest (temperature 2° to 4° C.) they survived for twenty-four days in one case and for thirty-eight and forty-one days respectively in two other cases. The diminution in the number of the bacilli when added to sterilised spring water is very rapid. The rapidity may be fairly indicated by the following example:

At the beginning of experiment .	94,000 bacilli per c.c.
8 hours later . . .	77,000 ,, ,,
24 ,, . . .	33,000 ,, ,,
48 ,, . . .	13,000 ,, ,,
72 ,, . . .	2,000 ,, ,,
5 days later . . .	120 ,, ,,
6 ,, . . .	2 to 14 ,, ,,

In contaminated waters, such as those obtained from rivers containing numerous micro-organisms and a considerable amount of nutritive material, when sterilised, Strauss and du Bary found that *B. typhosus* survived longer in the more impure samples than in the less impure. From

Vincent's experiments it does not appear that the same holds good for *B. dysenteriæ.* When mixed with Seine water, sterilised in the autoclave or by Chamberland filter, the bacilli were found dead as follows: at a temperature of 1° to 4° C. in thirteen days, and at a temperature of 16° to 14° C. in ten to twelve days. If, however, the mixture was kept in total darkness the life of the bacilli could be prolonged by four to six days. The bacilli survived nearly as long in Seine water sterilised by heat as in the same water sterilised by filtration. As regards the action of light on the dysenteric bacilli when in water, the author found that when a small quantity of culture was added to a tube of sterile water and the tube exposed to sunlight, the bacilli died in from two to two and a half hours. If a large quantity of culture was added, from four to five hours was necessary for their destruction. Under similar conditions, *B. typhosus* and *B. coli* survived in the first case five hours, and in the second seven hours. In an artificial water (sterilised), analogous in chemical composition to muddy ditch water, after six hours' insolation the bacilli were killed. From these and other experiments he found that the bacilli of dysentery are easily and rapidly destroyed in water by the action of sunlight, and that their resistance to sunlight is much less than that of *B. typhosus* or *B. coli*, whether in distilled water or in impure and muddy water. From experiments made by growing *B. dysenteriæ* in waters containing common water and air micro-organisms in greater or less numbers, it was found that the life of the dysenteric bacilli in such circumstances is short, and inversely as the number of saprophytic organisms present. In other words, it was found that the more contaminated the water was the more rapid was the disappearance of the dysenteric bacilli, especially at a temperature of 15° to 18° C., and *a fortiori* at a temperature between 18° and 38° C.

In artificially contaminated water the multiplication of common bacteria is extremely rapid at ordinary temperatures, and he never recovered dysenteric bacilli added to such waters after from two to five days' keeping at 22° to 38° C., nor after from four to seven days at 15° to 18° C.

In water containing 220 saprophytic micro-organisms per c.c., the *B. dysenteriæ* was found alive after nine to eleven days at a temperature of 15° to 18° C., while in the ice-chest (2° to 4° C.) it was alive in one case at the end of twenty-three days, and in another after twenty-seven days, but not longer. Repeating these experiments with waters of different degrees of contamination, Vincent found that at a temperature of 2° to 4° C., which arrests the development of saprophytic bacteria, the *B. dysenteriæ* disappears more quickly in the water containing the larger number of the saprophytic organisms. He also found that, having added *B. dysenteriæ* to flasks of water containing 72,000 saprophytic organisms, and placing these flasks in the ice-chest at 2° to 4° C., the dysenteric organisms persisted for a long time (ten to fourteen days), and when the water was frozen in the refrigerating chamber at − 6° C., and kept at that temperature, positive cultures could be obtained from the flasks twenty-two days later. *B. dysenteriæ* frozen in *distilled* water and kept at the same temperature were alive up to sixty-eight days in one case, and in another up to fifty-seven days.

The practical deductions from Vincent's work are that ice, which *may* preserve alive for two months dysenteric bacilli, may be a means of transmission of dysentery, and that the rôle played by drinking water in the ætiology of that disease is limited not only by the short persistence of the bacilli in water, but also by their rapid diminution in number. It would therefore be imprudent, in Vincent's opinion, to limit to potable water the origin of bacillary dysentery. It is especially in soil and in the contents of privies that we should search for the cause of the epidemic extension of dysentery in houses, villages, regiments, and schools. Heat and light act especially powerfully in killing *B. dysenteriæ*, and consequently also in preventing its dissemination by the digestive tract. On the other hand, cold and want of light are potent factors in preserving its vitality. Consequently epidemics of great severity should occur in cold countries, and such is the case. Colin has stated that from 1859 to 1862 the disease was epidemic in Norway, and that from 1852 to 1860 there were annually 9000 attacks with 2500 deaths. In the year 1857 alone there were 37,000 cases, with 10,000 deaths. The disease is much worse in the northern districts of Russia than in the south. In such climatic conditions the bacillus of dysentery finds during winter, in rivers, in ditches, in collections of water in depressions in the ground in the neighbourhood of houses, in road drains, ruts, etc., conditions suitable for its survival. In tropical and subtropical countries it is different. There the feeble vitality of the bacillus in water is still further limited by the influence of light and temperature, which exercise, directly or indirectly, a harmful influence on it.

REPORTS OF THE MEDICAL SOCIETIES.

Glasgow Pathological and Clinical Society.—*October* 8, 1906. —The President, Dr. J. Lindsay Steven, in the chair.—Dr. T. K. Monro and Dr. James A. Adams showed a patient suffering from spasm of the muscles of the lower part of the trunk and thighs. The patient was a bank clerk, æt. 46, who began to feel nervous and to have pains in his back about three years ago. Even earlier than this his back would get stiff on sitting much, but in other respects he was quite healthy. His symptoms progressed during the first few months, but since then they seemed not to have advanced further, though they have repeatedly relapsed after improving temporarily under treatment. He got relief for a time from one sedative after another, but soon each lost its effect. He could suggest no cause for his illness, and the family history threw no light upon it. He was on his feet for seven hours daily when at his work, but was not confined to one spot. Attempts to move and any kind of excitement brought on the spasm, and if he persisted in attempts at movement the condition of the muscles did not improve. There was complete relaxation during sleep. Knee-jerks present, and sensation was normal. The condition was obviously a neurosis characterised by tonic spasm of the voluntary muscles of the lower part of the trunk and upper parts of the lower limbs. The slight aching pains in the back were apparently due to the fatigue of the muscles involved. Dr. Monro could find no account of any exactly similar case in the literature, and was inclined to regard the condition as an occupation-neurosis, analogous to writer's cramp, and the overwork of the muscles in this case explained by the constant standing.—Mr. Freeland Fergus and Dr. A. L. M'Millan gave a communication on the removal of the lachrymal sac in cases of chronic suppuration.—Dr. Alex. Napier and Dr. J. Anderson related the history of a case of tumour involving the lung, pleura, and mediastinum, and microscopical preparations of same were shown. The patient, a young woman, æt. 24, was admitted eighteen months ago to hospital as a case of chronic pleurisy. About six weeks previous to her admission she suffered from pain in the right side of the chest, aggravated by lying on that side and by coughing, and had suffered from loss of flesh and strength, and occasionally from night-sweats. The family history indicated a tuberculous tendency. The signs of a right-sided pleurisy, with effusion, were made out, and a small quantity of fluid was removed by aspiration, which contained mono-nuclear lymphocytes, eosinophiles and pleural endothelial cells, and a number of diplococci, but no tubercle bacilli. She was dismissed improved, but fifteen months later was readmitted. The physical examination indicated a thickening of the pleura over lower part of right lung, and the case was regarded as tuberculous in nature, but tubercle bacilli were never obtained in the sputum. A fortnight after admission she was seized with an acute pericarditis, from which she recovered, but later developed marked dulness on the affected side. The conditions found at autopsy showed an adherent pericardium, heart displaced by the consolidated lung, and a tumour mass in the anterior mediastinum. The glands in the posterior mediastinum and around the bronchus were enlarged. The greater part of the right lung was replaced by tumour tissue, and this had penetrated the diaphragm and given rise to a large growth in the upper part of the right lobe of the liver; the pleura was much thickened. The microscopic appearances of the tumour showed a very dense growth composed of aggregations of spindle-shaped cells with alveolar disposition, and large elongated nuclei resembling a spindle-celled sarcoma, but probably of the nature of a pleural endothelioma.

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MEDICAL JOURNAL.

EDITORIAL.

Insanity in Scotland.

THE Forty-eighth Report of the Commissioners in Lunacy for Scotland affords much food for reflection to all who are interested in a question which has become one of great social and economic importance. At the commencement of the year 1906 there were 17,450 patients in Scotland under the cognisance of the Board, and of this number no fewer than 14,850 were "pauper" patients. Comparing these figures with those given for the year 1857, the first year of the Board's existence, it is found that there has been a rise from a total of 5824 to 17,450, an increase of almost exactly 200 per cent. The population has increased during the same period by 56 per cent. It is more interesting and valuable, however, to see what is the ratio of the insane to the general population for each of these years. The figures show a fairly uniform and steady rise every year until the last, when it has remained stationary, that is to say, the increase in the number of the insane has been exactly parallel to the increase in population. This ratio stands at present at 363 insane persons in every 100,000 of population, or one insane person to every 275 of population. These figures are reassuring, though it may be pointed out that they are dependent to a certain extent upon continuity of methods of administration. When the number of patients registered for the first time is investigated, it is found that both in the pauper and private classes there has been a slight but steady decrease since 1903, and that last year this decrease was more decided than it had been. So far as Scotland is concerned, it would therefore appear that there is a quite recognisable diminution in the incidence of fresh cases of insanity, and that this disease is not, as is frequently stated, really increasing.

If we turn to the discharges, it is found that there has been, and still continues to be, a steady decline in the percentage of pauper patients discharged "recovered," to those admitted during the year. This diminution has been very steady for the last twenty-five years, and in view of all that has been done during that time in the way of treatment and improving the surroundings of patients, it is a distinctly disappointing result. The only explanation of it offered in the Report is "that patients of the poorer class whose mental and physical condition is such as to preclude all hope of recovery are being admitted to asylums in increasing numbers." There is a general consensus of opinion amongst asylum superintendents that persons in moribund states, or suffering from incurable physical diseases, complicated with mental unsoundness or decay, are now sent to asylum hospitals instead of being sent to ordinary infirmaries, or of being kept at home until they die. This view is further confirmed by statistics of the deaths in asylums. These show an absolute and relative increase for some years past, and especially in recent years. The increased death-rate is most noticeable in the case of recently admitted patients. It is pointed out in the Report that the health of the community has not shown any corresponding deterioration, but rather the reverse, so that the cause of the increased death-rate in asylums must be special and not general.

A "Foul Shave."

THOSE persons who frequent the barber's establishment for the purpose of being shaved (and, in a less degree, of having their hair cut or dressed) are, from the nature of things, exposed to various sources of contagion, differing indeed in grade and kind, but the result manifesting itself as what is popularly known as a "foul shave." Such a term does not connote any one accurately recognised disease, for diverse maladies may be communicated in this manner. The principal ailment, however, contracted in the above-mentioned way, is tinea barbæ, or ringworm of the bearded region of the face; and as this first obtrudes itself on the sufferer's attention by a sensation of itching, it has come to be designated "barber's itch." From a search into the out-patient record of a large hospital, we find that of all cases of cutaneous diseases this constitutes almost exactly 2 per cent. It is far less frequent in private practice, yet even there sufficiently common to attract notice. The disfiguring, often disgusting and painful, aspect of the disorder is too well known to our readers to call for special description; but it may be observed that its features vary from a mere scaliness to the production of bulky freely suppurating prominences. Another disease, sometimes also acquired at the same place, is impetigo contagiosa, so well known as occurring epidemically in public schools. This, if equally obnoxious, is of less serious import, inasmuch as it may be more readily and expeditiously cured. Sycosis is yet another disease which may be come by in like fashion. If the virus of impetigo contagiosa is a streptococcus to commence with, as appears probable, that of sycosis is a staphylococcus, and the extreme obstinacy of the complaint is proverbial. To the list of possible dangers must be added that of acquiring pustula maligna, carbuncle, tuberculosis, and syphilis. With regard to the first two, positive evidence is scanty. There are so many other and more likely sources of the implantation of tuberculosis and syphilis, that though their incidence is well within the range of compatibility, yet it would require most careful sifting of the evidence to fix the onus absolutely on the barber. We are on much less certain ground when we charge him with communicating such diseases as eczema, seborrhœa, or alopecia areata, all of which have been at one time or another regarded as incidentally so acquired. It is in his allied function of hairdresser that such culpability has been attached to him; but as the contagiousness of any of the three is, to say the least, still unproved, these may be for the present left out of consideration. Apart from them, the catalogue is quite sufficiently long and alarming. When we consider the close and prolonged contact existing between the operator and his customer, it is surprising not that a small proportion suffer, but that so many escape. His implements, too, are of such a kind and used in such a way as to facilitate infection. The razor, whether sharp or dull, may inflict wounds or abrasions. The porous character of the bristles in the brushes employed offers the very conditions necessary for the lodgment and growth of parasitic elements. The lather is in no sense inimical to their survival, while the very air is liable to be loaded with the media of convection diffused through it in process of sweeping the floor or of brushing débris from clothes. If seborrhœa is conveyable, no means can be more appropriate than the rotary hairbrush for spreading it widely. It will thus appear that the risks of submitting one's person to the tender mercies of the coiffeur are neither few nor small, and must necessarily increase as the rank in life of those who visit his shop descends in the social scale, and the price paid for the attention given becomes less. We have been led to make these observations from a perusal of a series of articles dealing in great detail with this topic, and the measures to be adopted to deal with it, from the pen of Dr. Karl Ullmann.[1]

Suggestions for Prevention.

In endeavouring to cope with the dissemination, through the medium of the barber and hairdresser, of the diseases we have enumerated, there are certain obvious methods which, if adopted, would wholly prevent their occurrence. These are either not to shave at all, or to do this for one's self and with one's own exclusive implements. Were the public sufficiently educated to a sense of the gravity of the dangers run by frequenting the barber's shop, a greater proportion might be deterred and induced to follow a rational system. But as society is constituted, this, we fear, is a counsel of perfection, since even those who have themselves suffered are known again to expose themselves to similar risks. The average age of those infected with tinea barbæ we find to be 31·4; so it is evident that it is not the adolescent who becomes affected, but the adult man. In the statistics at our disposal, the youngest in fact was already 20, and the oldest 57. The chance of contagion would be assuredly minimised were each customer to have his own razor, strop, brush, and soap securely preserved for his sole use. But this, while possible in the better, could hardly be carried out in the lower class of shops. Rules and regulations of a too severe and restrictive character would not be put in practice, and, should an endeavour be made to enforce these, would certainly occasion much friction and difficulty. Even materially modified, they would necessitate a rise in charges such as customers would decline to pay. While, therefore, it seems impossible wholly to prevent the transmission of such diseases, a good deal can be done to diminish the chances of acquiring them. For this, civic authorities should obtain powers to inspect barbers' shops, and even to require them to be licensed. In particular, none ought to be permitted in areas or sunk flats, where the existence of a damp atmosphere favours the growth of low forms of vegetable fungi. The shops must be well lighted and properly ventilated. No principal or assistant labouring under any presumably contagious disease should have leave to practise his trade till cured. Sponges and soap-boxes should be banned. In place of these, pledgets of absorbent wool, to be destroyed after use, and fluid soap, which can be poured into a clean saucer and any residue thrown away, ought to be exclusively employed. Any customer who showed evidence of skin eruption should be shaved in private, if at all, and warned to put himself at once under medical care. The razor seems sufficiently secured by dipping in boiling water and being dried with a clean towel. The brush may be dispensed with, and the hand, washed immediately before, used to apply the soap and get up a lather. Towels must be small and only used for a single client, or soft porous paper may be conveniently substituted. The floor should be of cement or polished stone, or laid with waxcloth or linoleum, so as to be easily, quickly, and thoroughly cleaned. Most of the disinfectants in vogue are more or less irritating to the integument, and their casual and extemporaneous application is of more than doubtful efficacy. It is probably the better policy not to resort to them under any circumstances. In hairdressing, the rotary brush and the hair clipper should be discarded; it would be much the best plan not to brush the hair, but merely to comb it out, since to provide a clean hand-brush for every customer is a serious and expensive affair, yet it is the only way out of the difficulty. Metal combs, care being taken that the points are not too sharp, should replace those of horn or vulcanite. The barber or hairdresser, while on duty, should wear a linen overall or large apron, not likely, as woollen materials are, to collect particles of hair or epidermic scales. When all is said and done, one must bear in mind that customers voluntarily lay themselves open to jeopardy, but, were the above-stated suggestions followed, the peril is trifling.

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[1] *Allg. Wien. med. Ztg.*, 1906, Nos. 14 to 29.

ORIGINAL COMMUNICATIONS.

THE DIGNITY OF MEDICINE.[1]

By SIR DYCE DUCKWORTH, M.D., LL.D., F.R.C.P.

IT it hardly necessary for me to express to you my deep sense of the honour you have conferred on me in inviting me to open this Session of our venerable Society, or the pleasure and satisfaction which it affords me.

My connection with this Society is indeed of long standing, for it is forty-seven years since I joined it as an ordinary member, and forty-five years since I was elected one of its annual Presidents.

The Presidency has always been regarded as one of the "blue ribbons" of the Edinburgh student of medicine, and a reference to the names of those who have held this office, and the positions they have filled in later life, must satisfy any inquirer that the occupants of our presidential chair have an ideal placed before them which is calculated to stir their energies throughout their whole professional career.[2]

I should fail in my duty here and now, if I did not bear witness to my indebtedness to this Society. It certainly helped me to make many dear friends, and its stimulating influences not only stirred my ambition, but provoked a wholesome enthusiasm for my work. I can recall instances, too, where this influence came to bear on some of its more languid members, and roused them to a degree of energy and emulation which, otherwise, might never have been quickened.

The discipline and dignified conduct of the Society's meetings, the training in debate, and the exercise of the critical faculty, were an invaluable part of our student life.

On an occasion such as this, one in my position is tempted to look back to the past, while in no degree forgetting that for those whom he addresses the future lies open, with all that it holds in store for them. Memories of former days now crowd into my mind, and I picture in this unchanged hall the faces of many old friends, and even recall the tones of their voices. Alas! many of these have passed away after longer or shorter periods of life, not a few in distant parts of the Empire, some amidst the exigencies of war, or in the public services, and others while filling varied spheres of professional importance and usefulness at home. Yes,

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[1] An Address delivered before the Royal Medical Society of Edinburgh, at the Opening of the 170th Session, 26th October 1906.

[2] Amongst these may be mentioned: Caleb Hilliar Parry, Astley Paston Cooper, Gilbert Blane, John Bostock, H. H. Southey, Henry Holland, J. Elliotson, Richard Bright, Marshall Hall, John Davy, Charles Hastings, Alexander Tweedie, J. C. Coindet, John Conolly, James Bardsley, Allen Thomson, J. Y. Simpson, John Goodsir, J. Hughes Bennett, John Reid, W. B. Carpenter, T. B. Peacock, Douglas Maclagan, W. R. Sanders, Spencer Cobbold, J. Burdon Sanderson, Charles Murchison, and T. Grainger Stewart. Amongst the Ordinary Members: William Cullen, Joseph Black, the Monros, James Gregory, Robert Willan, Mark Akenside, Richard Brocklesby, Oliver Goldsmith, George Fordyce, Walter Farquhar, John Haygarth, Lucas Pepys, Benjamin Rush, John Hunter, J. Edward Smith, Mungo Park, Charles Darwin, Peter M. Roget, John Latham, John Ayrton Paris, Francis Bisset Hawkins, James Clark, James Syme, William Sharpey, Robert Christison, Thomas Addison, R. Carswell, C. J. B. Williams, J. Risdon Bennett, J. Matthews Duncan, Joseph Lister, and Wilson Fox.

> "The past will always win
> A glory from its being far."

It is pleasing to find in the Professoriate here, still active and fresh, at least two of the Presidents of my time, in the persons of Dr. Crum Brown and Sir Thomas R. Fraser, and two a little junior to me, Dr. John Wyllie and Mr. John Chiene. It is also pleasing to know that Dr. Smart is still active, keen, and thoughtful as he always was in the debates of the early sixties. You have recently had before you one of the best speakers of that time, Sir James Crichton Browne, a senior President in 1860, and you have doubtless followed the fortunes of another of our contemporaries, the late Attorney-General, Sir Robert Finlay, who took his degree with me, and forthwith proceeded to study law. The present Regius Professor of Medicine in the University of Dublin, Dr. Little, was also an active member in my time. Your present Professor of Botany came somewhat later, and I had the pleasure of examining him for his degree.

Let me tell you next something of the system and details of the teaching then in vogue here. There was John Goodsir, almost a giant in stature, and certainly in intellect, the foremost anatomist of the day; with him, as his Senior Demonstrator, the present distinguished Principal of the University, and Cleland, now the Professor of Anatomy in Glasgow, as a Junior Demonstrator; Lyon Playfair, afterwards Lord Playfair, made chemistry full of interest for us; Christison gave us masterly teaching on that now sadly neglected subject, the Materia Medica; Syme captivated us by his brilliant surgical acumen; and Simpson was ever a source of freshness to us, for he had many interests beyond those of obstetrics and gynæcology, in which he was a great master. Your late Professor of Midwifery, a former President of this Society, occasionally took his uncle's place, and gave promise of his future powers as a brilliant teacher. The clinics of Hughes Bennett and Laycock (my old chiefs), of Gairdner, Warburton Begbie, Sanders, of Miller, Spence, and Dunsmure, were all inspiring to the multitudes who followed them. It was a time in which to take sides, for there were certain professional feuds prevailing in those days, now happily unknown, which, if they were calculated to make the rivals of the Edinburgh School blaspheme, certainly promoted a keenness of atmosphere which was beneficial to the average student, who found it difficult to pursue a *via media*, and was stirred to an enthusiasm, always desirable in early life, for one or other of his masters. Anything is better than stagnation and dulness, and, indeed, amidst these contentions, new truths were slowly emerging out of the dusty arena. Lister was quietly building up his fame at the side of his father-in-law, Syme, and beginning to study the grave problem of sepsis, which was still the bane of the best surgery of the day. Simpson was venturing to urge greater boldness in dealing with the peritoneal cavity; for we were then solemnly taught that "all abdominal surgery was abominable surgery." Spence began to smell his sponges, and rinse them in dilute hydrochloric acid before applying them to any open wound. Bennett was proving to the physicians that a simple supporting treatment was all that was requisite to promote recovery from pneumonia, and that neither depletion nor stimulation were necessary routines of practice: and at this time the physical signs of mitral stenosis were first made plain for us by the intuition of Gairdner. There were other eminent professors at work during this period, including Aytoun, Kelland, Blackie, Campbell Fraser, Tait, George Wilson, and Allman. Traill was lecturing on Medical Jurisprudence when he was past eighty years of age. He died shortly after giving about the eighth one of the course which I attended, and the subject of it was Arsenic, with an account of the famous *Aqua Toffana*.

Apart from the immediate academic atmosphere in the city, we had, at the time I refer to, the dignified examples in the profession of Craigie, Benjamin Bell, James Begbie, John Brown, Andrew Wood, Douglas Maclagan, Daniel Rutherford Haldane, Matthews Duncan, Warburton Begbie, and others, men of the highest character and attainments, whose influence helped many of us in various ways.[1]

The teaching of Laycock as a clinician and psychologist was quite out of harmony with its time, a period given over to minute histology and pathology under the influence of Bennett, Beale, and Virchow. Many of us learned in later years to find the value and importance of many of Laycock's views, and to venerate his memory and his genius.

Some of us have thought that we were then over-lectured, and had inadequate time left to digest and meditate on all that was imparted to us. Times have indeed changed a good deal in this respect, and I imagine that while you have less *professorial* you have now more *tutorial* pabulum presented to you. Whether we suffered or not from a plethora of lectures, it was at least a privilege to sit at the feet of eminent masters of their subject, and most of us, I doubt not, found time in after-life to absorb and utilise the instruction we received. We were certainly inclined to some measure of narcosis during the four o'clock prelections on pathology by Professor Henderson. These were trying after a long day's work, including four previous lectures, dissections, and hospital attendance; yet the climate of Edinburgh gave us tone and much endurance.

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[1] "We pass: the path that each man trod
Is dim, or will be dim with weeds;
What fame is left for human deeds,
In endless age! It rests with God."
"In Memoriam."

There was then no Students' Union, and few were the opportunities of athleticism. Our great refreshment came in the summer sessions, with the delightful botanical rambles in the Highlands with our beloved Professor Balfour.

How much or how little all these reminiscences may interest any of you, I cannot tell. It has been said that "to understand and judge the present, we must deeply read the past. Those who know nothing of what men have been, have no standard by which to measure men as they are." If the times are changed, most certainly we ourselves are changed also. The conditions of life have indeed been marvellously altered in the course of the last half-century, and one of the most marked features of the change is the increase of activity and restlessness, and the decline of quietude and meditation. The pace has quickened, and most of the work done is hurried. May we not strike a note of warning here, and say with Robertson of Brighton, who remarked fifty years ago that "our stimulating artificial culture is destroying depth; that mere knowledge is not wisdom; that character in the world wants root"; and who gave us one illustration of this, the fact that "the folio of patient years is replaced by the pamphlet that stirs men's curiosity to-day, and to-morrow is forgotten"?[1] What would this writer say were he amongst us now? I think we greatly need to slacken our pace, and spend more time in meditation.

In regard to our modern system of education, let us recall the modern conception of the word University—a *studium generale* —and always bear in mind that such an institution is not designed for instruction in any one faculty, or merely to afford special teaching for any particular profession or career. In regard to our profession, no one can doubt that in this University the Faculty of Medicine is as complete and comprehensive as can be desired, and, according to some modern educationists, a curriculum in it alone would constitute a liberal education. I am not prepared to agree with this opinion, since I regard the preliminary studies of the humanities as of the utmost importance for all who aspire to take a high position in medicine. That condition is secured to you in some measure by the tests applied before you enter on your purely professional work. A large experience of medical students has long convinced me of the general superiority of those who have enjoyed a good literary and classical education before entering on the physic line. I do not believe that any variety of scientific study, by itself, can take the place of the humanities, or equally well train the mind.[1] In preparing for our profession, we have to take care that we do not develop into mere observers and healers of disease. In other words, we must beware of becoming too professional. It may never be forgotten that of all callings ours is the most essentially human, and therefore it is incumbent on us to acquire a full knowledge of human nature as exemplified in all sorts and conditions of men, women, and children. Charles Kingsley has told us that "if we do not know Nature, we shall never know Art," and we may be sure that if we do not understand human nature, we shall never become adepts in the practice of medical art. No amount of training in science or physic alone will ever develop or foster the true *ars medica*, any more than it will ensure a character for morality or plain common-sense. Happily for us, the essential nature of our work, and its grand catholicity, helps us better than those who enter other callings, so that it is easier for us, if we will, to acquire a full knowledge of our common humanity. If, however, we become attracted or engrossed by any collateral subject in our curriculum, we may lose this acquirement, and then prove failures as practitioners of medicine in after-life, despite academic honours and high scientific attainments. I have witnessed a good many of such failures, and it is well for any one who has been led astray into any one of these seductive bypaths, to pursue it to the best advantage, and leave the high-road leading to Physic.

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[1] Sir Walter Scott foresaw this eighty-nine years ago: "The ponderous folios so dear to the seventeenth century, from which, under favour be it spoken, we have distilled matter for our quartos and octavos, and which, once more subjected to the alembic, may, should our sons be yet more frivolous than ourselves, be still further reduced into duodecimos and pamphlets."—"Rob Roy," 1817.

Let me not be misunderstood. I am in no degree decrying the careful study of such scientific subjects as are wisely set down in your curriculum, but these have to be dealt with in strict relation to the whole course of studies, and no one of them can be permitted to hamper or delay the fluent pursuit of those which follow. Students of medicine are not being trained to become physicists, chemists, or biologists, but in order to understand the laws and principles underlying physics, chemistry, and biology, which certainly govern scientific medicine. It is commonly asserted that some of our modern examiners, as experts in science, are apt to forget this, and so fail to regard the medical aspirant in his proper light, losing sight of his particular aims and destiny, and, no less, of the great fact that, as Dr. Johnson expressed it, " there are two kinds of knowledge—one which a man can carry in his head, and another which he knows where to find."

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[1] I do not myself believe in science of any kind as the principal pabulum of the half-cultivated mind."—Professor James Clerk Maxwell.

We are sometimes told that there is a gulf fixed between science and art in all the professions, but I would ask, may we not aspire to the mental state of the great artist Leonardo da Vinci, and, as physicians, observing everything with precision and intensity, be led in the common passion for each, as he was, to regard them as almost one ?

Let me recommend to you some bypaths which, if not apparent just now, may be safely followed, and with advantage. Your professional work is exacting and engrossing, but whenever opportunities and leisure arrive you will do well to enlarge and refresh your mental powers by diligent reading of the best books in our literature, whether of history, romance, or poetry. You remember the story of Richard Blackmore, who asked Sydenham to recommend him the best books wherein to study medicine, and the seemingly paradoxical reply of the great physician, " Read ' Don Quixote.' " This was no paradox, however, but a sly intimation that a knowledge of medicine came not from reading medical books, but demanded from its followers a special aptitude, together with a full knowledge of men and manners. Provided that you have the aptitude for physic as a pursuit, you may gain much of this knowledge and wisdom by a cultivation of good literature. No one deserves to be a Scottish undergraduate who has not been enraptured by the fascinating novels of Sir Walter Scott, the charming writings of Dr. John Brown, and those of Robert Louis Stevenson, all *alumni* of this University. No young doctor should omit a study of Dickens, Thackeray, and Pepys' Diary. I need hardly mention the imperative duty of acquaintance with the works of Shakespeare, Wordsworth, Tennyson, and many other authors.

Another safe bypath for student life is that of acquiring a familiarity with one or more modern languages. These open up new worlds, and help greatly to the mental width and capacity of all who attain proficiency in them. They will at least introduce you to the best work of our continental brethren, and help to keep you abreast of the thoughts of some of the leading spirits in our art.

You will require no urging towards the bypath of athleticism while in the *status pupillaris.* That way is always seductive to wholesome-minded British youth. You have now opportunities for exercise and games which were not available in my time. I am reminded here of a dear friend, the senior President of my year of office and a fellow-resident in the Infirmary, who excelled in all qualities as a student, an athlete, and a volunteer, the late John Duncan, whose memory is still cherished in this city, and whose untimely death caused widespread regret. Some of the older

Edinburgh men have had misgivings about the numerous provisions now made for your academic social life and games, fearing lest the influences of the Union and your various clubs may distract you, and tend to dissipate your energies. I feel sure that in our time we should have welcomed a good deal of what you now enjoy, and not been the worse for such wholesome outlets. I have yet to learn that harm has come to you from any one of them. The importance of a *corpus sanum* is as great as that of a *mens sana*, and if the modern Scottish undergraduate is enabled to avail himself of these amenities, and also to cultivate literature and science on something more fortifying than the proverbial *avena tenuis* (though that need not be left out of the dietary), I will venture to believe that he is not undergoing a process of degeneration either in mind or body.

The last bypath I will mention may lead you far. I refer to the value of foreign travel whenever opportunity offers. There are few better means of enlarging the mind or cultivating human sympathies than are afforded by contact with the people of other nations, and, when possible, before settling into practice.

In selecting a topic which should be worthy of your attention, and of an occasion such as this, I have decided to discuss briefly one which is rarely treated in these days, and is, indeed, well-nigh lost sight of, yet is pregnant with importance both for the public and our profession. My subject is the Dignity of Medicine.

I suppose that it will hardly be maintained that our profession holds to-day the position it did half a century ago in the estimation of the body politic. Whatever explanations of the fact—for fact I believe it to be—may be adduced, there can be no doubt that any loss of prestige or appreciation of it is not due to decadence or inefficiency in the art or in the service of Medicine itself, for their progress has been greater and more beneficial to humanity within the period named than during the previous two centuries.

The fault must then either lie at our own door, and concern us individually in respect of our character and general conduct, or be the result of an altered disposition towards us and our work on the part of the public.

A measure of dignity has long been accorded to the Church, the Law, and Physic, and while I believe that the latter has not in more recent times kept its place, I am not sure that the former continue to hold theirs as securely as they formerly did. We are not, however, concerned with them. It may be that there is a common cause for a decline in the public estimation of all these professions.

Each individual represents his personal calling, and commends or asperses it by his character and attainments. I have already alluded to the influence of some of the representatives of Medicine in this city in my time, who set an example of dignity and high-mindedness. If I name but one, Sir Robert Christison, I specify a type of the man I have in my mind, and I feel sure that there are now in your midst men of like manner who exemplify the qualities I refer to.[1]

I might well add the name of William Pulteney Alison, who died in 1859, the year I matriculated, for his character and influence made a deep impression on all his contemporaries, and led the stern Carlyle to write of him as " the brave and humane Dr. Alison, whose noble healing art in his charitable hands became once more a truly sacred one."

I am not, however, concerned to treat of the dignity of the individual member of our profession, although much, indeed, depends on him as an exponent of the value and benefits of medicine when practised by an adept and a person of the highest character ; nor do I refer to those who by nature are void of any personal dignity, yet assume a professional counterfeit of it which ill befits them, and brings both contempt and ridicule on the masqueraders. Skill in physic alone does not constitute the highest excellence of the physician, and you have heard already to-night that knowledge does not always imply wisdom. A larger question remains, and it is this : What manner of man is he ?

I desire rather to speak of the dignity of Medicine as evidenced by its beneficent work, as a great social power in any community, and as spreading everywhere a wholesome influence. This is the particular dignity which appears to me to have declined in recent years, and largely ceased to inspire the respect which is due to it. It rests with us to recover and reconstitute this dignity.

The value and far-reaching benefits of modern medicine are not recognised as they deserve by successive British Governments, or by the majority of our municipal authorities. The proofs of this are unfortunately not far to seek. They are, indeed, lamentably notorious. The timorous, stingy, and inadequate provisions made for measures of public health, for the conduct of the insane, for the prosecution of research, and for the sanitary services generally, all bear witness to a mistrust of the high aims of Medicine, and an indifference to the unselfish and ill-rewarded labours of our profession. These humane efforts somehow fail to impress persons of enlightenment any more than those of ordinary intelligence. Not seldom, the most prudent advice is treated with suspicion, and the advisers, although experts in their subjects, receive little serious consideration or respect.

How little the public, or any British Government representing it, recognises its duty towards medical education, is shown by the fact that it contributes nothing directly, and very little indirectly, towards the maintenance and costly equipments of any School of

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[1] We look to our several Medical and Surgical Corporations to maintain our proper position before the public, and to exert a wholesome discipline in the profession in accordance with the powers they rightly possess. The Universities have little or no authority of this kind.

Medicine in Britain, and is content to leave these bodies to support themselves, while their teachers forego all or most of their emoluments to keep them in efficiency. In every other country in Europe their claim is fully recognised, and met by grants of public money in acknowledgment of the debt which is due to the beneficence of Medicine and those who teach it.

Do we raise undue pretensions if we claim honour and appreciation for those who labour, almost gratuitously, to train successive generations of practitioners who are subsequently to minister for the benefit of the public?

Again, we may trace the disregard of our municipal authorities for the progress of Medicine, or the advantage of the suffering poor, in the cruel extortion of rates from our hospitals which can so ill afford to pay them.

It might have been expected that with the progress of education there would be a corresponding interest in, and a growing appreciation of, the value of medical science in all communities. The discussions of medical subjects in the public press, and other ephemeral literature, so far from enlisting intelligent sympathy with the efforts of our original thinkers and workers, rather tend to place our suffering brethren and patients in a wrong attitude towards their medical advisers, and to induce a captious mood, which sometimes seriously hampers the successful treatment of their ailments. We notice rather, either a spirit of indifference, or a disposition to be over-critical, and, withal, a growing prevalence of credulity which for mental inanity almost equals, if it does not surpass, that of two centuries ago. These manifestations are obvious to any unprejudiced observer.

The relations between physicians and intelligent patients are hardly as satisfactory now as they were wont to be, and there is apt to be less confidence, if not, at times, an actual mistrust, on the part of patients, which assuredly does not work out to their benefit. This diminished confidence cannot invariably be set down to pretentiousness or undue assumption on the part of the medical adviser. It appears, indeed, to be a manifestation of the spirit of the age we are living in. Thus, even modern Medicine, with all its advantages, improvements, and enlarged resources, stands before the public shorn, apparently, of much of the dignity and appreciation it formerly enjoyed. If my contention is admitted, how may we seek to account for it? The following explanations occur to me:—

First, with respect to ourselves. We must note the fact that the average modern physician is not, as he formerly was, a man of general scholarship and wide learning; of that class, I mean, which compelled the respect and admiration of Dr. Johnson. Happily, I could point even now to some brilliant exceptions amongst us of men who would have shed lustre on any previous period. The reasons for the decline of the particular learning I refer to are fairly obvious. Medicine, ever a "jealous mistress,"[1] has now such heavy claims on the attention and devotion of her followers, that few men can find the time, means, or energy requisite to pursue abstract studies, or indulge in refined scholarship. To attain the special knowledge and practical experience now demanded, furnishes of itself a hard task, extending over many years, tending, perhaps unfortunately, to narrow the general outlook, and to leave little time and inclination for the pursuit of literary or other bypaths of learning. Most of the Universities have come to recognise these demands of modern Medicine, and altered their requirements accordingly, thereby reducing the claims of the *literæ humaniores* on their aspirants for degrees in Medicine, and replacing these by studies in science. The progress of the sciences on which our work is based is now so rapid and constant, that it has induced, or compelled, many modern physicians to pursue merely special departments of practice. We recognise the importance of experts in some of these parts of the great whole, but I am disposed to believe that we witness now an undue amount of differentiation, and an erection of specialities to a degree which is of doubtful advantage to the welfare either of Medicine or of the public. One result of this has been, as I venture to think, to lower the dignity of Medicine and of the profession, in some measure, before the world.

Again, it may be that some members of our calling fail to commend their profession or its dignity by their inflated pretensions, or manner of life, or, perhaps, in not a few instances, by an inherent inaptitude to adapt themselves to their varied social environments.

We must not be surprised if we provoke misgivings on the part of the intelligent public as regards our level-headedness or probity, when some of us express dogmatically opinions respecting matters and habits of daily life which are in plain contradiction to all experience and common-sense. As in other professions, we have in our ranks a proportion of unwise men and so-called "faddists," and it must be that they bring obloquy upon many others besides themselves. If our art and practice are not based on common-sense and strict integrity, I am sorry for Medicine. It is not always easy to refute in public such opinions and conduct as I refer to, and most of us have sometimes to fall back on the wise dictum of Bishop Andrewes, that "he who tolerates, does not necessarily approve."

We can hardly suppose that the conditions under which so many of our brethren have to work amongst the poor in large towns tend otherwise than to detract somewhat from a due appreciation of the claims of our art for respect and appreciation. I speak with all sympathy for these of our colleagues, knowing full well with what exemplary and ill-requited labour they spend the best days of their life in the service of exacting and often ungrateful communities. If the public is inappreciative of their efforts and sacrifices, we, at all events, are able to appraise them, and to include many of these toilers amongst the worthiest members of our body.

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[1] Andrew Clark.

We may be sure that anything approaching extortion, or greed of reward, must seriously impair the regard which is due to our body, and we may remember a remark of the late Dr. Matthews Duncan to the effect that "all extortioners die poor." Again, we may damage our position and usefulness by embroiling ourselves as extreme partisans in political or ecclesiastical matters, forgetting that, as physicians, we live in a higher aether, above the dust of such strife, and in a spirit of comprehensive catholicity and charity.

The best of us fully recognise our fallibility, yet we do well to regard ourselves, after strenuous preparation for our life-work, as solemnly commissioned to heal the sick, and we may at least pray and hope to be endowed with some measure of the χαρίσματα ἰαμάτων.

Our young aspirants in Medicine are, perhaps, not sufficiently led to entertain this particular conception of their calling. To be inspired with it would supply, as I venture to believe, a power for high motives and successful achievements. It might secure for us a worthier appreciation of our daily duties amongst our fellow-men.

Next, as regards the aspect of the public towards Medicine. The prevalence of the idea that our profession is largely available for gratuitous services, by no means adds to the respect in which it is held by the public, although as an abstract proposition this might well appear to be the case. It is true that every great physician or surgeon builds his fame primarily on the shoulders of the poor, yet it must be added that the poorest of the community are those who most often secure in our hospitals gratuitous services greater by far than can be obtained by the well-to-do in their homes. If the practitioner ventures sometimes to act upon the maxim, "*accipe dum dolet*," the remainder of the sentence is not seldom forced upon him, "*post morbum medicus olet.*"

I have alluded to the effect on the public mind produced by the discussion of medical and scientific topics in the daily press. The premature announcements of alleged discoveries and cures, or of new methods of treatment and diet, emanating often from men quite void of all clinical experience, are certainly mischievous. These abortive results, hurried out of German laboratories, for the most part, after occupying attention for a few weeks, naturally come to nothing, yet they are apt to be reckoned to us as failures in the field of legitimate Medicine. Though most of us are innocent in these matters, our patients express surprise when we confess to ignorance of the last new vaunted method of treatment or the value of some fresh product of coal tar, of which they have acquired a knowledge from the newspapers.

As I have already remarked, the time has passed by when the physician was amongst the few scholars and learned men of his day, and was thus a personage or an outstanding man in society, and I have shown that this position was due to the fact that the scope of Physic was then much smaller, and could be compassed with less effort than is possible now. Moreover, in respect of these men, we find ourselves as much impressed by their high character as by their medical attainments, by their wisdom as well as by their knowledge. It is in this manner that we rightly venerate the memories of such men as Sydenham, Boerhaave, Harvey, or Thomas Browne, who have left behind them splendid ideals for lesser men to try and pursue in all ages. We may bear in mind what the late Sir Henry Holland (who joined this Society exactly a hundred years ago) once remarked to me: "There must always be an aristocracy in every profession." We must try and meet the pressing claims of modern Medicine as fully as we can, and yet strive to study in some other fields of mental culture. So only shall we grow robust in mind, be level-headed, and better fitted to hold our place amongst members of the other great professions.

To sum up, we find that there is an inherent dignity in Medicine as a science and as an art; that it is fraught with benefit to mankind; that its power to spread these benefits increases in every age, and gives token of special progress in the near future. We believe that its noble ideals and the unselfish efforts of its servants deserve the respect of all right-minded people, and demand their interest and sympathy. We regard those who practise Medicine as priests of the body upon whom the State may always rely for loyalty and prudence, as men who are daily in touch with all classes, and enabled, apart from all politics, by their discipline, steadfastness, and Christian humanity, to stem the tide of Socialism and other mischievous tendencies, whencesoever they may emanate.

Recognising this dignity ourselves, we are, or ought to be, impressed by the grandeur and importance of the problems which we, as its ministers, have to solve, by the memory of all the good and great men who have preceded us in this task, and by the ideals they aspired to. To venerate and try to copy the examples set before us in the remote and recent past by members of our calling, who, by their knowledge, skill, and wisdom, have assuaged the miseries and raised the standard of health of their fellow-men, is a duty for each one of us now and henceforth. And with some pride do we point for appreciation to the heroic, untiring, and unselfish work, so often maligned, done by our pioneers in research, by our brethren every day in the midst of pestilence, and, when occasion requires, in the forefront of the line of battle.[1] Nor do we forget those labouring single-handed in various unexplored regions of the earth.

Surely a fair consideration of these facts amply testifies to the dignity claimed for our art, and for those who practise it. We may go calmly on our way, conscious of the glories of Medicine, if, whatever the world may think of us or our calling, we try to be worthy of the character of Sydenham, as described in Johnson's Life of him: "for his whole character was amiable; that his chief view was the benefit of mankind; and the chief motive of his actions, the will of God, whom he mentions with reverence well becoming the most enlightened and penetrating mind. He was benevolent, candid, and communicative, sincere and religious; qualities which it were happy if they could copy from him, who emulate his knowledge and imitate his methods."

Gentlemen, I fear I may have wearied you with what may appear to some to be mere platitudes. It is not unfitting here and now to discuss such a subject as I have laid before you this evening. You are now preparing for your future life-work, and varied, indeed, will that be. Yet, wherever you may be called to exercise your profession, you will surely often stand in need of self-respect, patience, forbearance, and wisdom. The special duties of ordinary practice will call for calmness, brightness, and self-control. These are not lessons to be learned in any classroom or laboratory, but they will not fail to be at your command if you start in professional life with the highest ideals of the dignity of Medicine, and of your work in it, taking ever the high line of duty which leads always to success, securing at once the respect of your friends, and the confusion of any that may be inimical.

My affectionate wishes and my best hopes go out now for the long-continued prosperity of this old Society. May its future history be as brilliant as its past, and its high reputation ever remain one of the most prominent and interesting features of the Edinburgh Medical School!

PRIMARY BRONCHO-PNEUMONIA IN ADULTS.

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The literature on the subject of broncho-pneumonia is very silent regarding the occurrence of primary forms, particularly in adults.

In the majority of the books which deal with it, broncho-pneumonia is described as a disease secondary in its origin, and most commonly secondary to bronchitis, chiefly affecting persons in the early and late years of life, and especially children. One author, Aufrecht, in Nothnagel's "Practice of Medicine," affirms that it is almost exclusively a disease of children, and that, putting out of account cases of deglutition and aspiration pneumonia, he has never seen characteristic forms of catarrhal pneumonia in adults. He, however, notes the occurrence, in some cases of fibrinous pneumonia, of pain, pleurisy, and mucous râles on the apparently healthy side, and considers that there the pneumonic process fails to attain its full development. The cases described are presumably adults, but the undeveloped pneumonic process on the apparently healthy side would not appear to be a typical fibrinous one.

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[1] The Army Medical Service has gained more Victoria Crosses for valour in proportion to its numbers than any other branch of the Army.

Primary broncho-pneumonia is described very fully by West as occurring in children. Contrasting the condition with the secondary form, he draws the conclusion that primary and secondary forms are of different origin bacteriologically, secondary forms being chiefly of streptococcal, and primary forms of pneumococcal origin, and that the pneumococcal inflammation occurs with equal frequency in the adult and the child, but takes a different course in each (in the adult a massive and in the child a disseminated consolidation). He maintains that there is no real pathogenic distinction between the two. He does not, however, refer to the primary lobular condition as occurring in adults.

Osler also describes a primary form of broncho-pneumonia in children, associated with the presence of the pneumococcus; and other authors (Munro, Lockwood, and Kidd, in Bain's "Text-book of Medical Practice") mention the occurrence of a primary form, but in children only.

On the other hand, Anders, in his "Text-book of the Practice of Medicine," describes two clinical forms, primary and secondary, and states that the primary form is met with generally in adults, with the symptoms of a severe form of acute bronchitis.

Gibson also, in his "Text-book of Medicine," admits the occurrence of a primary broncho-pneumonia of adults, and cites cases coming under his own observation in workmen on the Forth Bridge.

In this paper I will endeavour to show that the disease known as "catarrhal pneumonia," "lobular pneumonia," "capillary bronchitis," and "broncho-pneumonia" is by no means uncommon as a primary disease in adults, that it occurs chiefly in weakly persons, that it has different varieties (both pathologically and clinically), that these varieties depend chiefly upon the virulence and distribution of the infective agent, and that the infective agent in primary broncho-pneumonia is the same as in primary fibrinous pneumonia, namely, the pneumococcus, with occasionally a mixed infection with the streptococcus.

I would urge that primary broncho-pneumonia should be classed along with fibrinous pneumonia, and be kept distinct from the secondary forms of broncho-pneumonia, as it undoubtedly differs from it in its etiology.

Primary pneumonia would thus be capable of being described as an infective disease, due to the pneumococcus, affecting persons of all ages, and presenting grave constitutional symptoms, with signs pointing to the local seat of infection, and showing both lobar and lobular implication of the lung.

That young children are more liable to the lobular form may be explained by the more distinctly lobular arrangement of the lung in the child, the minuteness of its bronchioles, and its more limited power of expelling matters entering its respiratory tract.

Within a short time after my first arrival in India I was impressed with the number of cases of catarrhal pneumonia which presented themselves.

In 1893 I was serving on the North-West Frontier hills, in charge of detachments of native Indian troops, and was then struck with the character of many of the cases of pneumonia among the sepoys. Again, in 1895, in the camp at Wana, after the Waziristan Expedition, during which I was attached to a native field hospital, we had a severe epidemic of pneumonia among the troops, and again it was noticeable that in a large number of cases, though the onset and the symptoms were very similar to those of fibrinous pneumonia, the physical signs in the lungs were typical of lobular pneumonia.

In cantonments, as in the field, the cases of serious illness among soldiers are at once brought to the notice of the medical officer by the unfitness of the sick man for duty; consequently the cases are seen from the first. In my experience as medical officer of a regiment, a proportion of the pneumonia cases every year presented the characters of broncho-pneumonia. In some cases, too, of fibrinous pneumonia I have detected in the apparently healthy lung fine rhonchi and crepitations, and sometimes pleuritic friction, occasionally developing into the formation of a small area of consolidation, a condition not unlike that remarked on by Aufrecht, in which it is fair to assume that the infection on both sides was a similar one, but different only in degree.

Of these cases, however, I regret that I possess no record, and am thus able to speak of them merely in a general fashion. I will simply observe that all these cases were adults, in the prime of life for the most part, though they might be weakened by privations, fatigue, and exposure to a climate exceedingly cold in the winter months.

Since I came to Lahore I have had the opportunity, as second physician to the Mayo Hospital, of observing a large number of cases of pneumonia in the wards, and as pathologist I have also been able to see a certain number of these cases post-mortem; and it is from this later experience, rather than from that previously mentioned, that I venture to formulate a statement regarding the frequent existence of broncho-pneumonia among adults as a primary affection. I have been able to make bacteriological examinations of the sputum in a large number of the cases, and in a few to observe the pathological lesions after death. Owing, however, to sentimental and religious objections, post-mortem examinations cannot always be obtained, and thus it often happens that the observations begun in the wards cannot be completed when the case terminates fatally.

The following table from the records of the Mayo Hospital, Lahore, will serve to illustrate my remarks.

It shows the cases of, and deaths from, fibrinous pneumonia and primary broncho-pneumonia in the three years 1903, 1904, and 1905. Cases of secondary broncho-pneumonia have been carefully excluded.

Table showing Monthly Incidence of Cases and Deaths from Fibrinous Pneumonia and Primary Broncho-pneumonia at the Mayo Hospital, Lahore, in the years 1903, 1904, *and* 1905.

Month.	1903.				1904.				1905.			
	Fibrinous Pneumonia.		Broncho-pneumonia.		Fibrinous Pneumonia.		Broncho-pneumonia.		Fibrinous Pneumonia.		Broncho-pneumonia.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
January	12	2	2	0	9	3	3	1	4	3	3	1
February	9	1	1	0	11	1	1	0	4	1	4	1
March	7	2	1	1	2	1	...	...	3	0	1	0
April	8	1	4	0	3	1	2	0	4	3	5	0
May	5	3	6	1	...	...	4	0	3	0	1	0
June	5	3	1	0	...	...	2	0	2	0	1	0
July	3	1	...	...	3	0	1	0	2	1	...	...
August	4	0	...	...	5	1	...	...	...	...	1	1
September	5	3	...	...	1	0	...	...	1	0	1	0
October	8	3	1	1	1	1	...	...	3	1	3	0
November	13	4	4	1	2	0	6	1	2	0	1	1
December	6	3	...	...	4	1	...	...	8	4	3	0
Total	85	26	20	4	41	9	19	2	36	13	24	4

Etiology.—In the forty-three cases of primary broncho-pneumonia taken from the Mayo Hospital records for 1904 and 1905, pneumococci were discovered in the sputum in twenty-three cases, a proportion of 53 per cent., and out of this number pure pneumococcal infection was found in nineteen and mixed infection in four cases. Even if an error existed in diagnosing the cases with mixed infection as primary, a proportion of 44 per cent.

remains in which the only bacteriological causative factor would appear to be the pneumococcus.

With very few exceptions, all the cases were adults, and chiefly males. Neither women nor children form any large proportion of indoor patients in native Indian hospitals, and the fact that records of primary broncho-pneumonia among them are wanting is due to the customs of the people rather than to sex and age incidence of the disease. Women in the East lead a very secluded and domestic life, and do not like the conditions of existence in a hospital, and young children cannot well remain in hospital without their mothers, and, though they may be brought to the outdoor department for advice, are chiefly treated at home.

Aged persons may be affected by broncho-pneumonia, but the disease in them is more often secondary to bronchitis, and consequently the recorded cases show few old people.

Considering that the majority of the poor in India are insufficiently fed, badly clothed, and worse housed, and that their surroundings are, generally speaking, distinctly insanitary, it may be accepted that probably starvation, exposure, and bad hygiene are important predisposing factors in the etiology of an infective disease like pneumonia.

The climate of the Punjab, of which Lahore is the capital, shows great variation in day and night temperatures in the latter part of September, in October, November, February, and the first half of March: while December and January are bitterly cold as a rule. In the hot weather, commencing with April, the plains are scourged by periodical dust storms which fill the atmosphere with a fine, almost impalpable, certainly microbe-laden, dust. These usually cease with the advent of the monsoon rain storms in July; but in dry years they continue till rain sends relief. At all times, also, except after rain, the dust on the roads and footpaths lies thick, and is thrown into the air by the incessant traffic of foot passengers, vehicles, and cattle, always to be found in the neighbourhood of cities and large villages.

Natives herd together in small and insanitary dwellings, seldom or never cleaned out, from which ventilation is excluded as much as possible; they sleep with their heads invariably covered in their meagre blankets; as a practice they rise before daylight, even on chilly winter mornings, for purposes of nature: and, especially when sick, they expectorate freely about the walls and floors of their habitations.

It is small wonder, therefore, that the pneumococcus, living in surroundings so favourable for its development, attacks persons whose vitality is lowered by insufficient food, bad air, chills, bowel complaints, and that great scourge of the autumn months, malaria. In nearly all of the cases recorded, some history of debilitating disease was obtained, particularly malaria, dysentery, and diarrhœa.

The infective agent and a suitable soil are thus provided.

Pathology.—The pneumococcus is inhaled into the respiratory tract in small or in large quantity, either "filtered," as in nasal, or unfiltered, as in mouth breathing, and either alone or in company with other organisms.

It may be got rid of by what Stöhr describes as the "excretory division" of the lung (the trachea, bronchi, and bronchioles), without causing injury there, being either discharged with the ordinary expectoration or absorbed by the bronchial lymphatics.

On the other hand, it may obtain a lodgment in the "respiratory division" of the lung (the terminal or respiratory bronchioles, alveolar ducts, and alveoli).

Here the condition set up becomes one of degree (the effects depending on the virulence of the infective agent, the resistance of the victim, the numbers of the pneumococci present, and the limits of their distribution in the organ), and is evidenced by varying degrees of general constitutional derangement dependent on the toxins absorbed, and of local inflammatory reaction dependent on the presence of the organisms themselves.

In primary broncho-pneumonia the pneumococcus obtains a lodgment in the terminal bronchioles, and invades the mucosa, producing toxins. This results in an inflammatory reaction on the part of the mucous lining. This reaction is catarrhal in nature, and consists in hyperæmia of the capillaries in the wall, swelling and desquamation of the lining epithelium, with increased secretion of viscid mucus, and exudation of serum and leucocytes from the congested vessels, filling the lumen with greyish-white or muco-purulent secretion.

The catarrhal exudation and the swelling of the mucosa lead to a certain amount of occlusion of the lumina of the terminal bronchiole and alveolar ducts, intensified by inspiratory effort, with the result that collapse of the lobule connected with the occluded duct very frequently takes place. The air in the collapsed lobule becomes absorbed, but it may remain capable of being inflated with air for some little time, surrounded by hyperæmic, œdematous, and emphysematous neighbouring lobules. Later, the lobule becomes the seat of consolidation. This may be due to an inflammatory reaction taking place due to infection having occurred previous to the collapse, or to an extension of the inflammatory process from neighbouring lobules as described further on.

The catarrhal condition of the terminal bronchiole, above described, may be confined to that bronchiole (bronchiolitis, capillary bronchitis), or the alveoli may become affected as well (alveolitis). The pneumococci may enter the alveolar ducts and reach the alveoli by extension from the affected respiratory bronchiole, or the infection of bronchiole and alveoli may be simultaneous (bronchiolo-alveolitis).

The local reaction to the irritation of the toxins produced by the pneumococci takes the form of a catarrhal inflammation of the affected alveoli, both in those originally attacked and in those contiguous to them. The capillaries in their walls become engorged with blood, and the air vesicles become filled with an exudate, consisting of swollen and shed epithelial cells, fluid which may sometimes show a few threads of fibrin, red blood corpuscles, and leucocytes, which have found their way out of the engorged vessels in the effort of nature to combat the local invasion. This condition extends to the alveoli of the entire lobule.

The lobule, thus filled with exudation, becomes more or less consolidated; though air is not always entirely driven out, and the communication with the air in the bronchi may be kept up.

The number of lobules thus affected will naturally depend on the distribution of the pneumococci.

Thus it may happen that either a small or a large number of individual lobules, scattered throughout both lungs, is involved, constituting a "disseminated" or "diffuse" form of broncho-pneumonia.

In other cases, larger areas of lung tissue, comprising several lobules, are implicated. Here an extension by contiguity of tissue takes place. The pneumococci find their way into the interlobular septa, and with their toxins affect the walls of the alveoli of neighboring lobules, causing an inflammatory reaction there similar to that in the originally affected lobule. A like result is produced by lateral extension of the infective process from the walls of an infected terminal bronchiole in "capillary bronchitis." The size of the consolidated areas will depend on the virulence of the micro-organisms and their toxins, and the distribution of the pneumococci in greater or less numbers in that particular area.

All degrees of consolidation may be seen, from one affecting only a few lobules to one in which nearly all the lobules in one lobe of the lung are involved. As a rule, even in this "pseudo-lobar" form, the entire lobe is not equally affected, as areas of hyperæmia, œdema, emphysema, and collapse lie between and among the areas of consolidation.

These areas of consolidation, of a greyish-red colour, can be distinctly seen. The collapsed areas are darker than the rest, and on the surface of the lung are depressed. The emphysematous lobules are rather pale and prominent on the lung surface, and the congested areas are a brighter red. The lung is mottled in colour, engorged with blood, and moist on section; and a catarrhal exudate can be pressed out of the tiny bronchi in the middle of the consolidated patches.

The differences in the forms of broncho-pneumonia above described are merely in the extent and degree of the inflammatory reaction. It may be said that the local reaction is proportionate to the local stimulus, and its object and effect is to check the further progress of the invading pneumococci.

Where the pneumococci, either alone or in company with other organisms, reach the superficial lobules of the lung, they come into close relation to the pleura, both by contiguity and from the nature of the lymphatic connections there, so that either the organisms themselves, or their toxins, find their way into the sub-pleural plexus of lymphatics, and thence, by the stomata between the pulmonary pleural cells, into the pleural sac. The tendency to proceed outwards into the pleural sac is naturally increased by the direction of the air pressure from the lung in inspiratory expansion of the thoracic wall.

The effect of the irritation produced is to bring about an inflammatory reaction on the pleural surface, an attempt on the part of nature to protect the pleural cavity by sealing up the stomata and localising the disease. This reaction will differ in degree according to the severity of the stimulation. Thus we may have a mere hyperæmia with some swelling of the endothelial cells lining the membrane, or we may get a serous or a "fibrinous" exudate poured out in small or large amount, or the process may result in pus formation and the development of empyema. Where pus formation occurs, it is probable that a pyogenic organism such as the staphylococcus is present, but in other cases the pneumococcus is sufficient.

It is more than possible that many of the cases of primary pleurisy which are not followed by tuberculous disease are in reality due to an infection of the pleura by the pneumococcus in the manner described above, either with or without broncho-pneumonia in the subjacent lobules of the lung.

Broncho-pneumonia, as described in the foregoing pages, differs widely from fibrinous pneumonia. The appearances in the latter are distinct, largely owing to the nature of the exudate, and the general, equal, and simultaneous involvement of a great part or the whole of one lobe. Here there is a portion of lung consolidated and "hepatised" from coagulation of the inflammatory exudate. On section, its surface is more or less granular and much less moist than in broncho-pneumonia, even where a lobe is involved. The difference, however, as in the case of the diffuse and pseudo-lobar forms of broncho-pneumonia, is probably a matter of degree in the reaction produced by the infective agent. The pneumococci being highly virulent, the resulting reaction is correspondingly violent, and leads to the outpouring of a serous fluid, and the escape from the capillary walls of large numbers of red blood corpuscles and leucocytes. The leucocytes, dying under the influence of the toxins, set free nucleo-proteid, which, with the lime salts in the fluid, produces fibrin ferment, precipitating the fibrinogen, and forming a fibrinous coagulum in the air vesicles. This has the effect of sealing up the entire lobe, and preventing the further invasion of the infective agent as far as the lung is concerned.

While these processes are taking place locally, a general intoxication is also proceeding, and the blood is saturated with the toxins produced by the pneumococci, even if some of the organisms themselves are not also present, having evaded the attempts of nature to keep them *in situ* in the affected lung. As a rule, however, the pneumococci, travelling from the lymphatics in the interalveolar and interlobular septa, are stopped in the bronchial glands at the roots of the lungs. Here, by the irritation of their presence and of the toxins produced by them, an inflammatory reaction ensues, and the bronchial glands become enlarged and swollen. The toxins meanwhile find their way into the blood stream. Disturbances of temperature, secretion, and excretion result, constituting the general symptoms observable. The cells of the body, however, begin to manufacture antitoxins, and in favourable cases the toxins are neutralised, and the general and local conditions are brought to a termination.

When this occurs the disturbance of temperature ceases either suddenly or gradually, and resolution sets in in the lungs.

The catarrhal exudate is disposed of, some by being expelled into the bronchi and ultimately expectorated, and the remainder by being reabsorbed,—the fluid by the blood vessels and lymphatics, and the cellular elements probably by the lymphatics alone. These lymphatics are interalveolar, and their contents pass from them to the interlobular and peribronchial lymphatics, and on to the lymph glands at the roots of the lungs.

The inflammatory products are usually completely got rid of, and the lobules return to the normal; but in other cases a degree of interstitial thickening may remain in the alveolar walls and interlobular tissue. This is a result of the inflammatory reaction in the course of the lymphatic vessels along which the actively virulent pneumococci have travelled while the disease was in progress. Some interstitial cellular increase is commonly met with in broncho-pneumonia, but it usually disappears with resolution. It may, however, persist in a chronic form, and lead to permanent fibrous changes.

Tuberculous conditions are by no means necessary sequels to broncho-pneumonia, but it is possible to imagine that the way is often paved for the entry of the tubercle bacillus by the devitalisation of the lung tissue by an attack of broncho-pneumonia in weakly and susceptible persons, more especially if the condition persists in a more or less chronic form.

Clinical history.—The character of the onset varies considerably. This can be readily understood from our knowledge of infections generally. It may be said that the effect produced is proportionate to the dose of the poison.

In the case of fibrinous pneumonia the invasion by the pneumococci is a severe one, in which the micro-organisms are virulent and in large numbers; and their toxins are suddenly thrown into the blood, with the result that severe general symptoms are suddenly produced.

Similarly, in the case of primary broncho-pneumonia, if the pneumococcus is virulent, and the attack, even though diffusely distributed through the lung, is simultaneous, the evidences of general infection are sudden and severe. Rigor is a not uncommon feature. In a number of instances the invasion, though sudden and definite, is unaccompanied by shivering, and in other cases, again, the onset is more gradual, indicating a less acute infection.

In the severe cases the chief symptoms are usually fever, pain in the chest, and cough, with rapid respiration and pulse, and frequently dyspnœa. In the milder cases these symptoms are modified, and some, such as the pain and dyspnœa, may be absent altogether.

The fever may commence with or without rigor. In seventeen out of the forty-three Mayo Hospital cases recorded, rigor was definitely present, a proportion of 39·5 per cent. In nine other cases (20·9 per cent.) the onset was sudden and definite, with fever or a feeling of chilliness, but no distinct shivering.

The fever may be high, attaining a temperature of 103° or 104°, and not infrequently 105° F. It presents remissions, as a rule, showing a difference of 2 or 3 degrees between the morning and evening temperatures, but this is not invariable, and occasionally it is practically continuously high, and resembles the temperature of lobar pneumonia.

The duration is variable, depending probably on the character of the infection and the vitality of the patient.

In the Mayo Hospital cases in 1904 and 1905 the longest duration was forty-two days, and the shortest four days. Eleven cases had a duration of twenty-one days and over. Three cases were removed by friends during the course of the disease, and their subsequent history is unknown, but the remainder (twenty-nine cases out of the forty-three cases recorded) showed an average duration of 12·9 days.

Defervescence was by lysis in the majority of the cases, namely, twenty-two, and by crisis in six, while four cases showed a rapid lysis, or what might be termed a "gradual crisis," a steady, almost uninterrupted fall of temperature covering two or perhaps three days.

The pain in the chest is sometimes a general oppression, but is frequently referable to one region. In the latter case it is usually sharp and stabbing in character, and indicates almost certainly involvement of the pleura.

The cough is generally short and dry at first. If may remain so all through, but more commonly becomes more pronounced and more free: occasionally it appears to come spasmodically in paroxysms. The sputum is glairy and mucous, becoming mucopurulent later on, but in a number of cases it shows the "rusty" character found in fibrinous pneumonia (seen in eleven of the forty-three Mayo Hospital cases).

Dyspnœa is sometimes intense, and accompanied by considerable cyanosis. This may be due partly to weakness of the cardiac muscle in debilitated subjects, and partly, possibly often entirely, to the extensive distribution of the lung affection, and the occlusion of a large number of lobules.

Where any considerable extent of respiratory surface is shut off, the rapidity of the respiration increases in compensation, and its ratio to the pulse rate may be markedly altered, as in lobar pneumonia. In the Mayo Hospital cases this disproportion was noted in the majority, though in eight out of all the cases (forty-three) it was not observed, and was only slightly noticeable in five. The average ratio, where a disproportion between the respiration and the pulse existed, was 1 to 3.

In severe cases the breathing is markedly hurried, with no pause. The inspiration is short, with a short expiratory groan or grunt. The diaphragm, and the acessory respiratory muscles, and also the alæ nasi, are brought much into action to assist the breathing. In milder cases the rapidity of the respiration is naturally considerably modified, as also its character.

Physical signs.—Inspection of the chest frequently shows, besides the character of the breathing mentioned above, some indrawing of the lower intercostal spaces on inspiration. This naturally occurs only when there is any extensive lobular occlusion or collapse.

Palpation may reveal some rhonchal fremitus in one or other area of the lung, but it is rare to obtain any increased vocal fremitus.

Percussion sometimes shows no change. At other times, especially in the lower lobes, a somewhat tympanitic sound, probably due to relaxed lung tissue, is elicited. In other cases, especially about the inferior angle of the scapula and in the mid-axilla, an area of dulness can be made out, though generally only by comparison with the opposite side. Occasionally, however, a marked dull note is evident over the greater part of one lobe.

Auscultation gives varied and sometimes conflicting results. At times the breath sound is much diminished, and the air entering the lung at the area examined is evidently very small in amount. More generally, the breathing is of the harsh vesicular variety, and the expiration rather prolonged; while in other cases bronchial breathing can be heard even though the percussion note is resonant. The area over which bronchial breathing can be heard naturally varies with the extent of the consolidation present.

The accompaniments vary from an extreme amount of high-pitched rhonchi, with medium crepitations (often copious), in all areas of both lungs, to an occasional sibilant rhonchus, audible in only one or two places, and possibly accompanied by a few crepitations. Sometimes, again, the only sign discoverable is a few medium crepitations. Pleuritic friction can sometimes be heard, but not infrequently, even when pleurisy exists, it is absent owing to the patient restraining his breathing to avoid the rubbing of the inflamed pleural surfaces, or is elicited only on making him take a deep breath.

The vocal resonance in many cases of broncho-pneumonia is unaltered; in others it is markedly increased either over the whole or part of one lobe (when other evidences of consolidation are usually present). Sometimes, however, it is only by listening carefully over most of one lung (for instance, the axillary and infrascapular regions, with the patient lying on one side with his arm raised above his head) that a variation in the quality of the vocal resonance in different spots can be appreciated.

These indications help us to assign more or less typical cases of broncho-pneumonia to one or other of the three classes defined by Osler, namely—(*a*) One in which there is little or no implication of the lobules, and the symptoms are indicative of an extreme capillary bronchitis; (*b*) one in which there is a diffuse lobular affection of one or both (nearly always both) lungs, with generally some accompanying change in the terminal bronchioles; and (*c*) a pseudo-lobar form, in which there is a marked involvement of one lobe, with extensive consolidation, although there is usually also evidence of diffuse lobular affection elsewhere.

There are cases, generally falling under the second category, in which neither the invasion nor the symptoms are very definite. Pain in the chest, cough, dyspnœa, and hurried respiration may be absent, and the only symptom at first may be fever, the nature of which is determined only after the lapse of two, three, or more days, when physical signs have manifested themselves.

One of the Mayo Hospital cases is an extreme case in point. Here the only symptom was fever. The patient had the usual pharyngeal cough of the inveterate hookah-smoker, but his lungs were quite clear. Various fruitless blood examinations were made, but it was not until the eleventh day of the fever that physical signs were found in the lungs, and some sputum was obtained which yielded the pneumococcus on examination.

The physical signs may be very slight and quite out of proportion to the gravity of the disease. Quite recently, in January 1906, I found, post-mortem, extensive broncho-pneumonia involving chiefly the right lung, and almost all of its lower lobe (smears from which yielded numerous pneumococci along with strepto- and staphylococci), in a case whose symptoms during life had been exceedingly severe fever, with no cough, and only a few crepitations in the right base, without dulness on percussion, as physical signs.

These, perhaps, are extreme cases, but they give an idea of some of the variations to be met with in the disease, and some of the difficulties to be encountered in making a diagnosis.

Recovery from broncho-pneumonia is gradual, even though the fever may subside by crisis.

The pain, when present, usually goes with the fever, if not before it. The pulse and respiration settle down to their normal ratio after a few days, certainly within a week.

The cough, however, remains, and a muco-purulent sputum continues until nearly all the physical signs have disappeared. The bronchial breathing which may have existed over consolidated areas is the first of the physical signs to become modified, and the increased vocal resonance ceases to be heard soon after this. The alteration of the percussion note and the crepitations and rhonchi are very persistent, and even after the entire lung has "cleared up" an occasional rhonchus may be elicited on making the patient cough.

In most instances recovery is complete, but it occasionally happens that cases do not fully convalesce, and continue to show some febrile symptoms and persistent local signs. My experience of such cases is very limited, and chiefly to those secondary to bronchitis, and, while recognising that a chronic interstitial form may follow upon an acute broncho-pneumonia, I have always suspected that a tuberculous infection has supervened, even though the tubercle bacillus has not been demonstrable in the sputum. Such cases rarely remain in hospital long enough to observe the later developments. They are satisfied to have recovered from the acute attack, and then go to their homes for change of air.

In the preceding pages I have not ventured on a consideration of the statistics of the Mayo Hospital cases as indicating the seasons when primary broncho-pneumonia is most prevalent, or the question of the greater virulence of the pneumococcus at one particular time, because the figures do not cover a sufficiently long period to warrant any definite pronouncement. In my experience, however, we generally look for what may be termed an epidemic wave of pneumonia at the commencement and at the end of the cold season, though lesser "waves" may appear during the winter. In the epidemics the earlier and the later cases are usually broncho-pneumonic in type. Possibly in the earlier cases the infection is mild, and virulence is gradually acquired by the passage of the organism through successive individuals, while in the later cases the pneumococcus is diminishing in vigour. It is noticeable that both previous to and during the months when the virulence of the pneumococcus is greatest (as shown by the higher proportion of deaths to cases in fibrinous pneumonia), the cases of broncho-pneumonia are numerous. This may, however, be due to the amount of infection to which different individuals are exposed, a severe infection causing fibrinous pneumonia, while broncho-pneumonia results from a less infection in individuals who might otherwise have escaped if they had not been weakly and in ill-health.

In the absence, however, of larger data, no conclusions are possible.

For the rest, I trust that I have shown sufficiently clearly the existence of primary broncho-pneumonia in adults as a definite clinical entity, and demonstrated the relations of its clinical forms to one another and to fibrinous pneumonia as being one of degree rather than of pathogenesis.

PERSISTENCE OF BACILLI IN THE THROATS OF CONVALESCENT DIPHTHERIA PATIENTS: A CLINICAL AND BACTERIOLOGICAL STUDY OF THREE HUNDRED CASES.

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In examining the throats of convalescent diphtheria patients at the City Hospital, Edinburgh, in order to enable them to be discharged with throats free from diphtheria bacilli, I found great irregularity as to the time when the bacilli disappeared. In this paper I give the result of a clinical and bacteriological investigation into 300 cases, made to determine, if possible, some cause for this irregularity, and some practical method for regulating the discharge of such patients.

In this investigation the presence of the diphtheria bacillus was decided on morphological grounds alone, so only those cases are included which, on admission to the Hospital, gave on blood serum culture after eighteen hours, bacilli which with Neisser's stain gave the so-called polar bodies. It is quite possible that several cases which did not fulfil this test were cases of diphtheria. Out of 571 cases admitted to the Hospital in 1905, 17·2 per cent. could not be classified as diphtheria, using this staining method as the standard. But although none of these cases were fatal, yet four showed signs of diphtheritic paralysis. Sims Woodhead, in his "London Metropolitan Asylum Board Report," found that 20 per cent. of cases admitted could not, from bacteriological examination, be classified as diphtheria; and Graham Smith, from the examination of records of 27,000 certified cases, found that 28 per cent. were not diphtheria. While there is this great difference between clinical and bacteriological diphtheria on admission to hospital, there is still a difference of about 5 per cent. between bacteriological results and what is finally classified in hospital as clinical diphtheria. I shall refer later to the value of Neisser's stain.

Many investigations have been made to determine the duration of persistence of bacilli in convalescent diphtheria patients, as the subject is one of great importance both to the public and to hospital authorities.

Sims Woodhead, in the "London Metropolitan Asylum Board Report," draws attention to the fact that in the year 1895, 12 per cent., and in the year 1896, 13·8 per cent., of the patients admitted were discharged with diphtheria bacilli present at the final examination. He is of opinion that all convalescent patients should be isolated in whose throats slightly virulent diphtheria bacilli remain. He says that in many cases this would involve detention in hospital or isolation over very considerable periods; and when we look at his table on the persistence of diphtheria bacilli, we see what this period means in some cases. In the years 1894–96 he mentions 226 cases which were detained for more than 100 days. The mean duration of his cases is fifty-two days, the longest period being 200 days. In the 1895 cases, one which had antitoxin and one which had no antitoxin had bacilli present for longer than 200 days; while in the 1896 cases, one which had antitoxin was positive up to the one hundred and eighty-ninth day, and one without antitoxin to the one hundred and sixty-ninth day. The majority of cases appeared to retain the bacilli in their throats from two to nine weeks.

Park and Beebe[1] examined 747 cases: 2566 cultures were taken from these convalescent patients; swabs were taken at short intervals after complete disappearance of the exudate until the throat was found to be free from bacilli. The second culture was taken three days after the complete disappearance of the membrane, and then when necessary every four or five days. The results were as follows:—In 315 cases the bacilli were no longer present three days after complete disappearance of the exudate; while in 427 the bacilli persisted for a longer time, namely, in 201, for five to seven days; in eighty-four, for twelve days; in sixty-nine, for fifteen days; in fifty-seven, for three weeks; in eleven, for four weeks; and in five, for five weeks. The mean duration was eight days from the date of disappearance of the membrane, the longest period forty-nine, and the shortest three days.

They also mention eleven cases investigated by Roux and Yersin, where the virulence was tested on guinea-pigs. The mean duration for these cases was 13·6 days, the longest period two months, and the shortest three days, from the time the membrane disappeared. In the same paper we get also the result of some investigations by Tobiesen, who found virulent diphtheria bacilli in the throats of twenty-four out of forty-six patients at the time of their discharge from hospital. The cases were of different types—mild, moderate, and severe; and though the date of discharge in thirteen of these cases was four to six days after the disappearance of membrane, yet it was a moderate case that was discharged with virulent bacilli still present thirty-one days after the membrane had gone. The twenty-two cases that were discharged "negative" had their throats free on an average about ten days after the disappearance of membrane.

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[1] *Med. Rec.*, N.Y., 1894.

Morse is also quoted, who in twenty-five cases found the average date of disappearance of bacilli to be ten days after the membrane had gone.

Walsh[1] gives an account of an examination of 800 convalescent diphtheria cases. 2500 cultures were taken, and bacilli were found absent as early as the sixth day, and present as late as the eighth week. The average time of persistence in his cases was twenty-four days in winter and twenty days in summer.

Cobbett,[2] in dealing with the subject of the presence of bacilli in the throats of convalescent patients, found that one or even two consecutive negative examinations were often followed by the finding of virulent bacilli, so in his results patients are only considered free from bacilli after three consecutive negative examinations. The mean duration of his cases was eighteen days, the shortest period being three days, and the longest 108 days.

Graham Smith[3] gives his experiences in two epidemics. In the Colchester epidemic (1902) the mean duration was twenty-eight days, and the longest period ninety-four days, three consecutive negative results being necessary before discharge. In the Cambridge epidemic of 1904 the mean duration was thirty-six days in notified cases, and thirty days in the case of contacts. The length of persistence varied between eight and ninety-nine days in notified persons, and in contacts between 122 and eight days.

Various cases of prolonged persistence are mentioned—Escherich found bacilli fully virulent after five weeks, Park after seven weeks, Belfonti after seven months, Golay after 362 days, Wesbrook after 135 days, Hewlett after twenty-two weeks.

Most of these investigations have been carried out in laboratories not connected with hospitals; and, while they give the average duration of persistence of diphtheria bacilli for convalescents, no mention is made of any condition which might account for this period being exceeded in any case. In this investigation each case has been studied clinically as well as bacteriologically, and the following are the points I have investigated:—

1. The mean duration of persistence of bacilli in convalescent diphtheria patients.

2. How many consecutive negative examinations should be got before a patient is discharged?

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[1] *New York Med. Journ.*, 1898. [2] *Journ. Hyg.*, 1901. [3] *Ibid.*, 1904.

3. Patients discharged with bacilli still present.
4. Return cases of diphtheria.
5. Is the duration of persistence affected by—(1) Season, (2) sex, (3) age, (4) number of days ill before admission, (5) by the amount and position of the membrane present, (6) by the amount of antitoxin given, (7) by the date of disappearance of the membrane, (8) by the condition of the throat in convalescence, (9) by local antiseptic treatment?
6. Bacteriology of the cases examined.

Of the 300 cases I have examined, some were patients during the months of February, March, and April 1905, but the majority, five-sixths, were in hospital last winter—October, November, December 1905, and January, February, March 1906. All cases were examined bacteriologically on admission; the examination being repeated next day if the first examination were negative. Positive cases were then examined every second day till they were negative on two consecutive occasions, and then at intervals of three or four days. When a positive result was got after a negative, the next examination was made two days later. The examinations were made without any regard to the presence or absence of membrane. Sterilised swabs were always used. The swabs were taken at the same time of day all through the investigation, namely, about 3 P.M., and the inoculated blood serum tubes were removed from the incubator next morning about 9 A.M., thus giving an 18-hours' growth. The following are the details regarding the number of cases:—

February, March, April (1905), fifty-two cases; October (1905), twenty-seven; November, forty; December, fifty; January (1906), forty-seven; February, fifty-seven; March, fourteen cases; and thirteen cases of scarlatina and diphtheria (1905–6).

The total number of bacteriological examinations made was 3151, giving an average of over ten examinations per case. Out of the 300 cases, forty-six were examined fifteen times or more; one case being examined thirty-two times.

All the cases except one had antitoxin. The internal treatment in the majority of cases was strychnine, replaced later on by Easton's syrup. In the January, February, March cases of 1906, formic acid was used. The routine local treatment was swabbing with boro-glyceride, and gargles of the following mixture:—

Toluol, 36 parts; spirit. vin. rect., 60 parts; tinct. ferri-perchlor., 4 parts.

In many cases peroxide of hydrogen was used, and in certain cases mentioned later on various antiseptics were tried.

The average time at which bacilli disappeared from the throat was 18·4 days, counting from the day when bacilli were first detected. The following are the averages for each month:—

February, April (1905), fifty-two cases; average, 11·79 days. October, twenty-four cases; average, 19·04 days. November, thirty-six cases; 19·94 days. December, forty-five cases; average, 22·84 days. January (1906), forty cases; average, 21·30 days. February, forty-nine cases; average, 19·06 days. March, fourteen cases; average, 12·43 days; diphtheria scarlatina, thirteen cases, 20 days.

Out of the 300 cases, twenty-seven, or 9 per cent., were discharged with bacilli still in the throat. Reference will be made to this group later on.

I now give the mean duration of persistence of some observers, as quoted by Graham Smith, with some additional figures.

Park, 1894 . . .	8	days	from disappearance of exudate.
Morse	10	,,	from disappearance of exudate.
Bissil, 1902 . . .	14	,,	
Cobbett, 1901 . . .	18	,,	(three consecutive negative examinations.)
Tobiesen . . .	10	,,	from disappearance of exudate.
Massachusetts Board of Health, 1902 . .	27	,,	
Graham Smith, 1902 .	28	,,	(three consecutive negatives.)
Woodhead, 1896 . .	52	,,	
Graham Smith, 1904 .	36	,,	(three consecutive negatives.)
Walsh	22	,,	
Roux and Yersin . .	13·6	,,	from disappearance of exudate.
Meikle	18·4	,,	(55·3 per cent., with three consecutive negatives.)

Adding six days on to those observations which were reckoned from the date of disappearance of the exudate, we get, as an average from these twelve observations, 22·9 days. If we exclude Woodhead's figures—several of his cases, namely, 226, were detained in hospital for more than 100 days—we get 20·8 days as the average duration of persistence of bacilli in the throats of convalescent diphtheria patients, reckoning from the first day on which bacilli were detected. When no bacteriological examination can be made, we get from these figures a rough rule for regulating the discharge of diphtheria patients. As we shall see later, the average day on which all exudate disappears from the throat is the fifth or sixth day from admission, and as fifteen days later (the twenty-first day) the average throat is bacteriologically clear, we may say that a patient cannot be considered free from infection till at least three weeks after the membrane has quite disappeared. As the stay in hospital of all diphtheria patients is between four to five weeks at the very least, this may explain why return cases of diphtheria are practically unknown, at least in this hospital, even for the years when no bacteriological examinations were made.

HOW MANY CONSECUTIVE NEGATIVE EXAMINATIONS SHOULD BE GOT BEFORE A PATIENT IS DISCHARGED?—Cobbett, as mentioned already, found that in several cases two consecutive negative examinations were more than once followed by the finding of virulent bacilli. He thought this might be due to swabs being taken too soon after the application of some antiseptic, or possibly due to some bacilli which had reached some of the nasal cavities, descending again to the pharynx. Graham Smith made three consecutive negative results the rule in his investigations, but admits that it is difficult in practice to enforce isolation till three consecutive negatives are got.

Park and Beebe's results are based on 2566 cultures from 742 cases, giving an average of about 3·5 examinations per case. Walsh's figures are 2500 cultures from 800 cases, so neither of them could have adopted the three consecutive negatives as their standard.

In the Edinburgh City Hospital, cases each convalescent was examined on an average about ten times. The first fifty cases recorded had an average of only about five examinations each, so it is on the other 250 cases that the attempt was made to secure three consecutive negatives. This we were able to secure in half the cases; but about 75 per cent. of the cases were discharged with two or more consecutive negative examinations. Forty-eight cases were discharged with one negative result; twenty-seven were discharged with bacilli still present at the last examination; this group will be referred to later on. Of the forty-eight cases discharged with one negative result, thirty had been negative on several occasions before the positive result that appeared before the final negative. Again, of the fifty-one discharged with two final consecutive negatives, forty had been negative on several occasions before the last positive result which appeared. Graham Smith had much the same experience in the Colchester and Cambridge outbreaks, negative examinations being frequently followed by positive ones. It is this fact that makes the discharging of diphtheria patients such a difficult matter for hospital authorities. When a child has quite recovered, parents naturally are anxious to have it home, and wish to know the probable date of discharge. If two negative results have been got, a day is mentioned as the likely date of discharge. What happens if the next culture gives a positive result? Must we begin examinations again to secure three consecutive negatives? and must this be continued up to 200 days if necessary? Few parents will consent to this, and there are few municipal authorities anxious to increase their expenditure by detaining such cases for such long periods.

Certainly aim at getting three consecutive negative examinations, but be content with a working standard of two consecutive negatives and be prepared often to adopt a lower standard.

PATIENTS DISCHARGED WITH BACILLI STILL PRESENT IN THEIR THROATS.—Out of the 300 cases recorded, twenty-seven, or 9 per cent., were discharged with bacilli still present in their throats. These cases occurred no matter what antiseptic or antiseptics were used. They were found at all ages, in cases ill only a few days before admission, and in cases ill several days before admission; in cases which had no membrane present; in cases where the membrane disappeared quickly, in cases where it persisted long; in cases with small and in cases with large doses of antitoxin. The only point common to them was the condition of the tonsils; for twenty-two out of the twenty-seven had enlarged tonsils in their convalescence. These cases had on an average about fifteen examinations each, one of them was examined twenty-six times. Sixteen of the cases never at any time gave a negative result; the others at different times gave one or more negative results and that too often a few days before discharge. There were in nearly every instance special reasons for discharging such patients, *e.g.* one was an infant, 5 months old, an only child; four others were also only children and under school age; where several members of a family had been in hospital with diphtheria, the persistence of bacilli did not detain one member much longer than the others; and in five cases experiments on rabbits gave no proof of virulence. From none of these cases discharged with bacilli still in their throats have we been able to trace one return case.

RETURN CASES OF DIPHTHERIA.—Return cases of scarlet fever are well known, no matter what precautions are taken. Return cases of diphtheria are very rare. None occurred in connection with the twenty-seven cases mentioned above, and there has been no return case in this hospital within the last six or seven years, even in the years before bacteriological examinations were made. We know the organism that gives rise to diphtheria; hundreds of patients must have been discharged with these organisms in their throats, yet no return cases occurred. This can only be explained in two ways: (1) The virulence of the organism must be greatly reduced; (2) those who come most closely in contact with convalescent bacilli-carriers must have some immunity.

1. *Is the virulence of the organism reduced?*—Many of those who have investigated the subject of persistence of bacilli, have proved on guinea-pigs that the bacilli are virulent sometimes months after all symptoms of diphtheria have disappeared. A few writers put no stress on such experiments. But, while many can bring forward this evidence of virulence, few can prove with absolute certainty that these long continued persistent cases have infected others. Tobiesen investigated the results got from twenty-four cases discharged with bacilli still present. He could

only discover one case where the evidence seemed to prove that a convalescent child had been the cause of diphtheria in the mother. Roux and Yersin found, by making cultures at various stages after the termination of the disease, that the bacilli gradually became attenuated. I am inclined to take the view that, if a patient has during the course of the disease been subject to thorough local antiseptic treatment, any bacilli left have their virulence greatly reduced, and are not likely to infect others. This loss of virulence was proved in the case of five patients in this investigation by experiments on rabbits.

2. *Have those who come most closely in contact with convalescent diphtheria patients any immunity?*—Goadby says that about 33 per cent. of people exposed to infection by diphtheria have bacilli in their throats. Graham Smith says the mean examination of very close contacts in families gives 51 per cent. of infected persons; in more distant contacts in institutions, 40 per cent., and in schools, 22 per cent.; whilst in the class of general contacts only 12 per cent. harbour diphtheria bacilli. Eyre and Flashman found diphtheria bacilli in about 33 per cent. of contacts and in 7 per cent. of healthy throats.

Thomas,[1] in reporting on twenty-nine school outbreaks of diphtheria in London, found that 85 per cent. of the children who were spreading diphtheria were between 5 to 8 years old. He next shows that the years of heaviest incidence of diphtheria are 3 to 4 and 4 to 5 years; there is a slight drop from 5 to 6; considerable drop from 6 to 7: a further drop from 7 to 8 years, and then the incidence becomes fairly level. So that between the years 5 to 8, children are passing from a high susceptibility to one of relative immunity, and therefore many of them may be liable to slight unrecognised attacks of diphtheria. If a child under 5 years be attacked by diphtheria, it will go down with a severe attack, and will not remain at school to spread the disease. There was no proof of children of this age being the source of the spread of diphtheria in any school. If a child over 8 years be attacked, and still attend school, as that age has a relatively high immunity, he supposes that many of them do not suffer from slight attacks. Between the ages of 5 to 8 years, however, if a child attend with diphtheria, a large proportion at that age is liable to an attack in a mild form, and the class becomes a source of danger, a few being ill enough to get the disease recognised as diphtheria, some carrying it home, and being excluded on account of diphtheria in the house, and more continuing to attend with slight clinical symptoms.

May not the above statements be the explanation why return cases of diphtheria are rare? If a case of diphtheria break out in a house, as 51 per cent. of contacts become infected, we may suppose that those most susceptible take the disease in a recognised form, and are brought to hospital; possibly following one another at a few days' interval, as very often happens. Suppose these patients be discharged from hospital later on with some bacilli still present in their throats, are they likely to cause return cases? They are certainly not as infectious as when they were first ill, and the others at home, not having developed diphtheria in the first instance, are not likely to develop it now by being in contact with these bacilli-carrying convalescents, seeing that 50 per cent. of themselves have bacilli in their throats. For bacilli have been proved to persist in the throats of contacts almost as long as in those who have had an attack of diphtheria.

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[1] *Brit. Med. Journ.*, London, 1904.

Is the duration of persistence affected by season?—As most of this investigation was carried out in the winter months, little can be said as to the effect of season on persistence. I give the figures for the different months:

February–April .	52 cases,	mean	duration	11·79	days.
October . . .	24 ,,	,,	,,	19·04	,,
November . .	36 ,,	,,	,,	19·94	,,
December . .	45 ,,	,,	,,	22·84	,,
January . . .	40 ,,	,,	,,	22·30	,,
February . . .	49 ,,	,,	,,	19·06	,,
March . . .	14 ,,	,,	,,	12·43	,,
Diph. and scarlat. .	13 ,,	,,	,,	20	,,

Walsh, however, finds the period shorter by a few days in the summer months. His figures being twenty-four days for winter, and twenty days for summer. The Edinburgh figures at any rate show a longer period for the months November, December, January, than for the other months.

Is the duration of persistence affected by sex?—Just as sex seems to have little influence, if any, on the occurrence of diphtheria, so I find it does not in any way influence the duration of persistence of bacilli in the throats of patients. Of the 300 cases, 143 were males, and 157 were females; and while the averages for each month may have varied a little as regards sex and the general average, the averages for the totals agree almost exactly with one another and with the general average—namely, for males, 18·33 days; for females, 18·6; the general average being 18·4 days. Again, of the 27 cases discharged with bacilli still present, fifteen were males and twelve females.

Is the duration of persistence affected by age?—An examination of the ages of the 300 cases bears out two well known facts regarding diphtheria—(1) That diphtheria specially attacks children under 10 years; (2) that the cases in the first 5 years are about equal in number to those of the second 5 years. 32 per cent. of the cases were under 5 years, 33 per cent. between 5–10 years, 20 per cent. between 10–15 years, 15 per cent. were over 15 years.

I expected to find that the influence of age on persistence would be little in the case of children under 10 years, while in those above 10 years there would be a shorter period of persistence, as local antiseptic treatment could be carried out more thoroughly in the older patients. Below I give a table with six age groups, showing the percentage of cases for each age, the mean duration for each age, a comparison of the Edinburgh figures with Walsh's results, and the age of the twenty-seven cases already mentioned which were discharged with bacilli still present at the last examination.

TABLE I.

Age.	Percentage of Cases.	Walsh.		Meikle.	Still + on Discharge.
		Winter, 24 Average.	Summer, 20 Average.	18·4	
Under 2 years .	32 per cent.	24	25	20	2
2–5 years . .		25	20	19·4	4
5–10 ,, . .	33 ,,	23	19	19·9	4
10–15 ,, . .	20 ,,	23	13	18	7
15–20 ,, . .	15 ,,	28	25	15	5
20 and upwards .		21	19	16·5	5

My figures agree on the whole with those of Walsh, except for the 15–20 years group. It will be seen also that of the cases which left the hospital with bacilli still present, ten were under 10 years, ten above 15 years, and seven between 10 and 15 years.

Is the duration of persistence affected by the number of days a patient is ill before admitted to hospital?—In the table below I give the percentage number of cases admitted at the different days of illness. It will be seen that out of the 300 cases, more than half were admitted on or before the third day of illness. I expected to find that the cases which came earliest under treatment would clear up quicker than those cases which had been ill for some time. The second column gives the duration of persistence for the different days of illness, and grouped averages for under three days, for four to five days, and for above that. The number of cases admitted on or above the sixth day of illness was small, and the length of duration very irregular; many of the cases were mild cases—cases with bacilli present in the throat and no clinical symptoms. Of the cases discharged with bacilli still present, twelve were admitted on or before the third day of illness, fifteen at a later date. But, again, of the twelve admitted early, a large proportion could not be classified as clinical diphtheria.

TABLE II.

Day of Illness.	Per cent. of Total Cases for each Day.	Duration of Persistence.		Cases with Bacilli present on Discharge.	
1 . .	4·07	23·8	20·6	...	12
2 . .	25·55	18·9		6	
3 . .	31·8	19·2		6	
4 . .	17	19·7	23·6	2	15
5 . .	10	27·6		9	
6 . .	4·4	Irregular 9·8	14·4	1	
7 . .	4·07	18·5		1	
8 and above	1·4	15		2	

Is the duration of persistence affected by the amount and position of the membrane present?—I have tabulated again the percentage of cases according to the part affected, next the average period of persistence, and thirdly those still positive on discharge. It will be seen that 84·2 per cent. of the cases had either one or both tonsils affected, and that the average time of persistence for all tonsillar forms of diphtheria was about 18·5 days. Why the right tonsil should have been affected less frequently than the left, and why the time of persistence and number of never negative cases should have been greater, I cannot explain.

TABLE III.

	Percentage of Cases.		Average Duration.		Cases Positive on Discharge.
Right tonsil	7·4	84·2	23·7	18·5	5
Left tonsil	13·3		13·6		2
Both tonsils	63·3		18·3		13
Tonsils and uvula . . .	11·4		16·5		4
Tonsil, uvula, palate . .	3		16·5		1
Posterior pharnygeal wall .	1·4		14·8		...

Two cases with no membrane.

Is the duration of persistence affected by the amount of antitoxin given?—As the amount of antitoxin given depends largely on the amount of membrane present and on the number of days the patient has been ill, we would expect to find the results here much the same as those got when these two conditions were investigated. From an examination of the 300 cases, I find that 84·6 per cent. of the cases received doses of 6000 units of antitoxin or under that; fourteen or 4·3 per cent. had doses of 11,000 or upwards, one case having 40,000 units. Of the first group, the mean duration of persistence was 18·8 days; of the second group, the duration was 21·8 days. Out of the twenty-seven cases which left the hospital with bacilli still present, ten cases had only small doses of antitoxin, namely, 1500 units, and only two cases had doses above 6000 units, namely, two cases with 8000 units each. This proves that very few of these cases were severe cases from a clinical point of view.

Walsh made investigations to find out if the administration of antitoxin shortened the duration of persistence, but found that while twenty-four days was the average for cases with antitoxin, twenty-five days was the average for cases without antitoxin. Only two out of my 300 cases had no antitoxin, and the average time of persistence for these was twenty days. Graham Smith, in the Cambridge outbreak, found the mean duration to be thirty-six in treated diphtheria patients, and thirty days in healthy contacts. Woodhead found a case which had antitoxin and one which had no antitoxin with bacilli present after more than 200 days.

On the whole, we may say that antitoxin seems to have little effect on the persistence of bacilli, for, while cases with small doses become free from bacilli a little earlier than cases with large doses, this is just another way of stating that mild cases clear up sooner than severe cases.

Is the duration of persistence affected by the date of disappearance of the membrane?—As many observers have reckoned the duration of persistence of bacilli from the time the membrane disappears, I have first of all examined the 300 cases to find the average day of disappearance for the series. I have taken the percentage number of cases for the different days on which the membrane disappeared, and as 73 per cent. had no trace of membrane left by the sixth day, we may roughly take the sixth day as the average date at which membrane disappears.

If we adopt the view of Councilman, Mallory, and Pearse, that the earliest lesions in membrane building are caused by diphtheritic toxins, and that later on, when necrotic areas are formed, these form suitable media for the growth of the bacilli, this will explain the persistence of bacilli in throats where the membrane has remained a long time, an abundant and rich medium having been prepared.

Again, many of the cases where the throat has taken a long time to clean are cases where the membrane has continued to spread, even after treatment with antitoxin, a proof that in that throat there is some condition specially favourable to the growth of the bacilli.

In the second column of the table below I have given the average time of persistence according to the day on which the throat is clean. Dividing these into two groups—one when the throat was clean on or before the sixth day, and a group for later dates—we see that the bacilli disappeared in the earlier cases, as a rule, under 18·4 days, while in throats clean later than the sixth day the average duration of persistence was about 24·9 days.

In the third column are the cases which were discharged with bacilli still present. Two of these cases never had membrane present; nineteen had membrane which disappeared on or before the sixth day; in the remaining six the membrane did not disappear till later. The only explanation of these nineteen cases is that the condition of the throat—enlarged tonsils with crypts and irregular surfaces—accounted for the persistence of the bacilli.

TABLE IV.

Date of Disappearance of Membrane.	Per Cent. of Cases for each Day.		Average Time of Persistence.		Cases Positive on Discharge.	
No membrane . .	0·66	72·9	...		2	
First day . .	1·8		17·0	16·2	1	19
Second ,, . .	8·0		11·4		3	
Third ,, . .	10·3		19·6		2	
Fourth ,, . .	15·1		15·2		3	
Fifth ,, . .	18·7		16·5		5	
Sixth ,, . .	18·7		18·0		5	
Seventh ,, . .	12·2	27·0	22·4	24·9	2	6
Eighth ,, . .	5·4		20·7		1	
Ninth ,, . .	4·3		28·8		2	
Tenth ,, . .	2·2		29·9		...	
Eleventh ,, . .	2·5		16·0		1	
Twelfth ,, . .			32·0		...	

Is the duration of persistence affected by the condition of the throat in convalescence?—It has been shown by many observers that certain conditions of the fauces, especially enlarged tonsils, are predisposing causes to diphtheria. Many of the cases admitted to the hospital had the tonsils greatly enlarged in the early days of the disease, but this enlargement disappeared later. Still a large proportion, 38 per cent., had enlarged tonsils at the date of their discharge. In the second column of the table below is the average duration of persistence for each month for these cases, while the third column gives the same figure for all the cases of each month. The fourth column gives the excess of duration of enlarged tonsil cases over the general average for each month. The results are, that out of 250 cases 38 per cent. had enlarged tonsils. The average duration in these cases was 24·1 days, compared with 19·37 days for the total 250 cases, *i.e.* 4·73 days more. The most striking figures are those of the last column, which show that out of the twenty-seven cases discharged with bacilli still present, twenty-two, or 86·5 per cent., were cases with enlarged tonsils. In addition to thorough and varied antiseptic treatment, various astringents were used, *e.g.* glycerin of tannic acid, iodide mixture, etc., but these had as little effect in reducing the enlargement as the antiseptics had in removing the bacilli.

Pegler, speaking at the British Medical Association Meeting at Leicester in 1905 on the subject of "What is Notifiable Diphtheria?" said that in cases notified week after week as still yielding diphtheritic bacilli, a careful examination showed that this was nearly always due to the presence of some unhealthy tonsil tissue with crypts in it. When this was removed *morcellement*, the bacilli could no longer be found. In other cases he found adenoid or naso-pharyngeal tissue to be the cause of the persistence.

Fever Hospital Authorities cannot enforce this surgical treatment. To secure a prolonged detention for cases with bacilli still present is often a matter of great difficulty, while it would, in the majority of cases, be impossible to get parents to consent to any surgical treatment of their children in an hospital for infectious diseases.

TABLE V.

	No. of Cases with Enlarged Tonsils.	Average Duration.	General Average.	Excess over General Average.	Cases Positive on Discharge.
October . .	6	26·6	19·04	7·5	3
November .	15	21	19·94	1·06	3
December .	25	25·6	22·84	2·79	3
January . .	16	31·6	22·30	9·30	5
February . .	28	21·5	19·06	2·44	8
March . .	7	18	12·43	5·57	..
Scarlatina and diphtheria	6	24·5	20	4·50	...
	103	Average, 24·1	Average, 19·37	Average excess, 4·73	22 out of 27

Is the duration of persistence affected by local antiseptic treatment?—Before the days of the treatment of diphtheria by its antitoxin, most attention was directed to the local condition, and various caustics and strong antiseptics were used to secure the removal or destruction of the membrane. Since antitoxin has come into use, less attention has been paid to the local condition, and such measures as forcible removal of the membrane and the application of strong caustics are not now resorted to, while even the use of antiseptics is not recommended by some writers. But we must remember that diphtheria antitoxic serum has no anti-microbic properties, and that therefore the local lesion should be treated on the same principles as any other infected wound. Few doubt the value of antiseptics as far as it concerns the cleaning of the affected mucous membrane and the removal of membrane and products of decomposition, but it is a question if the prolonged use of antiseptics does much good as regards the persistence or disappearance of bacilli.

I give in the next table the results got with various antiseptics. It is usually recommended if one antiseptic seems to have no effect on the bacilli, to change to another, and in all prolonged cases this has been done. It will be seen that no one antiseptic seems to be much better than another. Graham Smith had much the same experience. In attempting to shorten the period of detention of patients, various antiseptics were tried, but while good results were got in some cases, in others the antiseptic proved of no help.

Table VI.

	No. of Cases.	Average Duration.	Cases Positive on Discharge.
Boroglyceride and toluol	125	17	6
Carbolic acid (5 per cent. in glycerin) . .	40	21·8	2
Carbolic followed by corrosive (1–1000) . .	7	29	3
Lysoform, 5 per cent.	26	16·2	2
Lysoform and carbolic acid	9	22·4	1
Lysoform and chlorine water	5	19	...
Carbolic acid and lysoform	11	21·8	2
Lysoform and Izal	4	22·2	2
Izal, 1–400	5	16	...
Chinisol, 1–1200	4	20	2
Lysoform, carbolic, chlorine	3	39	5
Peroxide, carbolic, corrosive, lysoform . .	4	43	2
Peroxide, toluol, carbolic, lysoform . .	2	17	...

Conclusions.—1. Most cases of diphtheria are free from bacilli after three weeks from the beginning of the illness, and can be discharged with safety three weeks after the membrane disappears.

2. While it is good to have three consecutive negative bacteriological results before discharging patients, the difficulties of carrying this out make two consecutive negative results the most practical standard to adopt.

3. While every endeavour should be made to get all cases free from bacilli before discharge, special exemptions must always be made.

4. The fact that return cases of diphtheria are rare, seems to be due to—(1) Diminished virulence of the bacilli in convalescence;

(2) to some immunity possessed by those who have to come closest in contact with convalescents still carrying bacilli.

5. Duration of persistence is not influenced by sex, nor to any appreciable extent by the amount of antitoxin given, nor by the antiseptic used.

6. The duration of persistence is slightly lessened by season—less in summer than in winter; by age—less for older patients; by the early date of illness before treatment.

7. The chief cause of prolonged persistence is tonsils which remain enlarged during and after convalescence.

Bacteriology of the Cases Examined.—I give now a short account of the bacteriology of the cases examined, a result based on over 3000 examinations. To secure uniformity, the observations were always made by myself, at the same time each day, and the material used was always prepared in the same way. Sterilised swabs were used on every occasion. In using the swabs, care was taken that no part was touched by the swab except the part affected; as long as membrane was present, that part was swabbed; when membrane had disappeared, special attention was paid to the tonsils, if enlarged and ragged, otherwise a swabbing was made of the pillars of the fauces, tonsils, and back of pharynx. The swabs were taken daily at 3 p.m. Blood serum tubes were then inoculated by rubbing the swab firmly on the surface; and these were then placed in the incubator at 37° C. till 9 a.m. next day, thus giving eighteen hours incubation. From the resulting growths, by means of sterilised platinum needles, films were made on slides, stained by a modification of Neisser's stain, and examined by a $\frac{1}{12}$ in. oil immersion objective. The platinum needle was drawn freely over the whole surface where growth appeared. If this gave a negative result, several examinations were made from different parts of the surface and from different colonies, before the negative result was finally adopted. The blood serum tubes were made according to Löffler's formula—three parts of serum got from bullock's blood was mixed with one part of 1 per cent. glucose bouillon; small quantities of this were poured into sterilised test tubes; these were placed in a slanting position in a serum coagulator, and heated up to 95° C. After the tubes had coagulated they were sterilised by steam three times for an hour each time. I find this method much more satisfactory than the older method of slow sterilisation followed by inspissation.

Neisser's stain was used to detect the presence of the diphtheria bacillus. Many writers claim that this stain is unreliable,—they say that it does not always give the characteristic polar staining with some true diphtheria bacilli, and that, in other cases, characteristic staining is got with organisms not the true diphtheria bacillus. They prefer to use methylene-blue alone, or along with Neisser's stain. Others maintain that if diphtheria is to be diagnosed on morphological grounds, the results got by Neisser's staining are on the whole more valuable than when any other stain is employed. Graham Smith and Cobbett both used it: Graham Smith says, nearly all organisms considered on morphological grounds alone to be diphtheria, stained well with Neisser's stain, or Cobbett's modification of it. He found polar bodies in nearly all diphtheria bacilli, whereas Hofmann's bacillus did not show them—this was the result of the examination of over 2000 cultures. Andrewes also recommends Neisser's stain; he says it is to be preferred to other stains for diagnostic purposes; and while admitting that other organisms may give a somewhat similar reaction, he says "it is a very real help in the differential diagnosis between the diphtheria bacillus and some of its nearest allies." Schabad, in his investigation, in the pseudo-bacillus says that Neisser's stain is one of the most important means of distinguishing between the diphtheria bacillus and the pseudo-bacillus. In young serum cultures the so-called Ernst-Neisser polar bodies are regularly seen in diphtheria bacilli, and in the pseudo only in old cultures.

In the beginning of this series of examinations all films from cultures were stained, both by Neisser's stain and also by Löffler's alkaline methylene-blue, and the results got were almost on every occasion the same. I found a difficulty, however, in finding diphtheria bacilli by Neisser's stain, when only a few bacilli were present, owing to the faint colour of the bodies of the rods when either Bismarck-brown or vesuvin was used as the counter-stain After experimenting with various stains, I find a counter-stain which gives excellent results, and makes the detection of even a few bacilli easy, and at the same time stains all other organisms present — bacilli, cocci, diplococci, Hofmann's bacillus, etc. — so that they can be easily recognised. The acid methylene-blue of Neisser's formula is poured on the film which has not been exposed to any heat; the excess is immediately shaken off and the film dried on blotting paper. The counter-stain is next applied for the same time, and dried in the same way, and the specimen is ready for examination. The counter-stain is picro-erythrosine. I had got it from the Edinburgh University Laboratory for staining sections. It is made as follows:—1 per cent. solution of picric acid; 1 per cent. solution of erythrosine. Mix equal parts, and to the mixture add sufficient lithium carbonate to give a slight deposit. Filter before use. The pink colour given by the erythrosine to the bodies of the diphtheria bacilli and to the other organisms present, enables the dark blue polar bodies to be easily detected. In sterilising the platinum needle in the flame after preparing a film from the culture, a cracking sound is nearly always produced, as the culture attached to the loop is being burned off, if diphtheria bacilli be present in fair quantity. I have found this so constant that I look on it as the first rough indication as to the presence of diphtheria bacilli.

In order to record with ease the results of the different examinations, I adopted Wesbrook's classification of diphtheria bacilli into three groups:—(1) Granular, beaded, of polar stained rods; (2) barred rods; (3) solid or evenly stained bacilli. These again are subdivided into types according to their size or shape.

GROUP A.—The large involution forms—A granular, A_1 barred, A_2 solid staining.

GROUP C. — Commonly called the long diphtheria bacillus. C granular, C_1 barred, C_2 solid staining.

GROUP D.—The short diphtheria bacillus—D granular, D_1 barred, D_2 solid staining.

The D_2 type of Wesbrook is the form that gives most trouble from its similarity to Hofmann's bacillus. It is a bacillus with the opposing extremities flattened and thickened, while the distal ends are bluntly pointed or abruptly rounded. This description applies equally to Hofmann's bacillus, except that in the Hofmann bacillus the distal ends are always more blunted, and the breadth of the bacillus usually more in proportion to its length. Both have an unstained part between the two opposed members of the pair, but it is not known whether this is an actual space between the two bacilli, or an unstained part of one bacillus. Wesbrook found this D_2 variety to be the main one present in a very severe outbreak of diphtheria, Cobbett in his series of examinations never found it. I have found it occasionally, but there were always on the same film some rods of the C or D type, and often also good Hofmann bacilli. Experience soon enables one to detect Hofmann's bacillus, I have adopted the view now generally held, that it has no causal relation to diphtheria.

GENERAL RESULTS OF THE BACTERIOLOGICAL EXAMINATIONS.—The form of diphtheria bacillus found in this series of examinations was the granular, beaded, or polar-stained rod. Indeed, this is the form almost always got on Löffler's blood serum after about eighteen hours' growth. Wesbrook mentions that this type is usually the most prominent at the outset of the disease; that it gives place wholly or in part to barred or solid types before the disappearance of the diphtheritic organisms; and that solid types may sometimes be replaced by granular types when convalescence is established, and just before the throat becomes clean. But I have very seldom found the barred type; the solid type was often found, and more frequently as convalescence proceeded, but always associated with some polar-stained rods. The change most frequently noted was, that the long diphtheria bacillus C was gradually replaced by the short form D before the throat became finally clear.

Hofmann's bacillus.—This was found at all stages of the disease. It was often found in the first examination of cases of different types, mild, severe, and fatal. As a rule, however, it is more frequently found as convalescence proceeds. It is much more common in nasal cases. In those cases which were never negative it was rarely found, so I take its appearance, like that of streptococci, as an indication that the throat is likely soon to be free from diphtheria bacilli.

Staphylococci were got very frequently. I agree with Woodhead that the presence of staphylococci always makes the prognosis more serious than if streptococci are present; this was proved from the fatal cases which occurred during the time these examinations were made. But I also found that in cases with staphylococci present the diphtheria bacilli persisted much longer than when streptococci were present.

Streptococci.—It is still asserted by some that the presence of streptococci along with diphtheria bacilli is most unfavourable. Martin, Roux, and many American writers take this view. Osler says that the organisms most commonly associated with diphtheria bacilli are streptococci, and that they are most important, as they usually are the cause of suppuration in the lymph glands and of broncho-pneumonia. Andrewes does not think the presence of streptococci influences the prognosis in diphtheria. They are the organisms most abundant in the normal mouth secretions, and it would be strange if they were not frequently found in cultures from diphtheria throats. They are often the cause of secondary septic complications, such as suppurating cervical glands; but still it must be remembered that diphtheria bacilli are often got from suppurating cervical glands, and from the lungs after death. As far as the duration of persistence of diphtheria bacilli is concerned, the presence of streptococci is favourable. Cases where streptococci were found early soon became free from diphtheria bacilli, and it was found that streptococci usually appeared in all throats just before the throat became negative.

Many other organisms were frequently found—long, thin, faintly stained rods; diplococci, yeasts, tetrads, diplococci in chains; short, thick, faintly stained rods, often in chains; also large staphylococci and diplococci, which took on a dark staining of the same nature as the polar staining in the diphtheria rods. But none of these organisms seem to have any influence, one way or the other, on the duration of persistence of the diphtheria bacilli.

VIRULENCE OF THE BACILLI.—I am indebted to Dr. Beattie, of Edinburgh University Pathology Department, for carrying out this part of the work for me.

Cultures were taken from five convalescent diphtheria patients, and the cultures were found to contain abundant diphtheria bacilli. Four of these patients were in the fifth week of their illness; one was in the third week. None of the cases had ever given a negative result. Rabbits were inoculated from the cultures; two rabbits died from pneumococcal infection—pneumococci were found in the blood—and the other three remained quite healthy. Another rabbit was inoculated from a culture of almost pure Hofmann's bacillus from a patient on the fourteenth day of illness; ten days later the animal was quite healthy. As controls, cultures were taken from two fresh cases of diphtheria; two rabbits and a guinea-pig were inoculated; the guinea-pig died in forty-eight hours, and the rabbits in four days, death being due to diphtheria.

It may be said that the antiseptic treatment to which the cases were subjected from the date of their admission to hospital—a period of more than four weeks in most of the cases—might account for the loss of virulence in the bacilli in the first five cases. But that is a strong argument in favour of antiseptics, and is, I think, the explanation of the fact that no return cases have been known in this hospital for years. The experiment with Hofmann's bacillus was done simply to confirm the morphological diagnosis of that bacillus.

Other investigators have proved the virulence of bacilli found in many of their convalescent cases. Perhaps antiseptic treatment had not been so thoroughly carried out. At any rate, these experiments proved for these cases that, though many bacilli were present, there was no evidence of virulence, and no reason why these patients should not be discharged.

CONCLUSIONS.—1. For the morphological diagnosis of diphtheria, Neisser's stain gives the best results.

2. The polar stained or beaded rod is the rod nearly always got in blood serum after eighteen hours' growth.

3. As bacilli disappear from the throat, the long form C is usually replaced by the short D form.

4. Hofmann's bacillus is found in all variety of cases and at different times, but is more frequent during convalescence.

5. In cases with staphylococci present, the diphtheria bacilli persisted longest.

6. When streptococci appeared early, diphtheria bacilli usually disappeared quickly. Streptococci were found in nearly every case after diphtheria bacilli were gone.

7. Thorough and continued local antiseptic treatment diminishes the virulence of the bacilli.

I have to express my thanks to Dr. Ker, Medical Superintendent of the City Hospital, for permission to publish these results, and for many valuable suggestions.

SOME POINTS IN THE INTERNAL TREATMENT OF GONORRHŒA.

By H. De Meric, M.R.C.S., *Surgeon to the French Hospital, London.*

Although I have invariably placed local treatment for gonorrhœa far in advance of any internal remedies absorbed through the mouth and the digestive tract, yet I have been forced to admit that many cases exist in which, when local measures have necessarily to be stopped for a time (orchitis, epididymitis, cystitis), it is still imperative to continue the specific treatment of the discharge. Balsams have for years been acknowledged as the best internal remedies for gonorrhœa. Their action, however, has never been properly understood. It has been assumed that the constituents of the balsams rendered the urine antiseptic; now it has been shown by H. Vieth that whilst the antiseptic power of "balsam urine" is by no means great, it exhibits a decided power of allaying inflammation and of constricting blood vessels, and thereby a sedative and astringent action on the hyperæmic mucous membrane is produced tending to arrest the discharge. The two principal balsams put forward as useful in the treatment of gonorrhœa are the balsam of copaiva and the balsam of sandal-wood oil. Balsam of copaiva, whether alone or in combination with cubebs, in the form of the French "opiat," has been employed for many years as an internal remedy for a urethral discharge. In my own practice, both hospital and private, I have absolutely discarded this drug for a considerable period, principally on account of its nauseous taste, which not only renders the taking of it through the mouth exceedingly unpleasant, but also, even when the drug has been absorbed, disguised in capsules, hosties, etc., still remains to annoy the patient by the odour in his secretions and in his breath; besides these drawbacks, I have often seen a profuse papular eruption on the skin as the result of its administration. Another point, which I think has not been sufficiently insisted upon, is that copaiva, although acting more especially on the genito-urinary mucous membrane, has also a stimulating effect on other mucous membranes, such as those of the stomach and intestines, thereby causing nausea, indigestion, and purging, this latter, it is needless to say, being a most undesirable action. On the other hand, I am far from asserting that the action of copaiva on urethral discharges is not favourable. It is difficult to understand its curative properties, for it has been proved that, applied locally as an injection, it fails to produce its effect. The best explanation is the one given by Vieth with regard to "balsam urine," as mentioned above.

All the foregoing remarks concerning copaiva may be applied to sandal-wood oil, excepting that administration of the latter never, in my experience, produces a rash on the skin; but, on the other hand, the nephritic congestion it sets up is more severe than that produced by copaiva; the proportion of cases in which the remedy has to be discontinued is, I have found, far larger in the case of sandal-wood oil than of copaiva. However, sandal-wood oil has during the last few years become the fashion as an internal remedy for urethritis, and although I by no means think its curative action on the urethral mucous membrane is superior to that of copaiva, still sandal-wood oil, though nauseating, is not so nauseating as copaiva, either in the mouth or in the stomach and intestines; therefore, in the small number of cases in which, for various reasons, I have considered an internal remedy to be indicated, I have prescribed sandal-wood oil.

Internal remedies for gonorrhœa can only, in my opinion, be looked upon as adjuncts to the treatment by injections, for no drug administered through the mouth has been proved to have a bactericidal effect on the urethral mucous membrane. It is evident that to deal with the gonococci a bactericide must be brought into direct contact with them. The scope and title of these observations do not permit me to deal with the external treatment of the malady; I will therefore confine myself to the consideration of the two principal balsams I have mentioned, namely, copaiva and sandal-wood oil. With reference to the latter, I was much interested in an article by Drs. H. Vieth and O. Ehrmann.[1] The work of these gentlemen consisted in testing practically on the human subject pharmaceutical results obtained by investigations based on the separation of the balsams into their constituents. Four different classes of substances, standing in close relationship to each other, were isolated, namely—(1) Terpenes, (2) terpene alcohols, (3) resin acids, (4) resins and other neutral gums and esters.

By experiment it was proved that only the last of the four groups does not give rise to the secondary actions of the balsams, *i.e.* irritant effects on both stomach and kidneys; but these effects were markedly caused by the other constituents of the balsams, especially by the two first. East India sandal-wood oil belongs to the terpene alcohol group, 90 to 95 per cent. of the oil consisting of the terpene alcohol santalol. Even moderate doses of what is called pure sandal-wood oil generally produce gastric disturbances in rabbits. To obtain a non-irritant preparation for the therapeutic use of sandal-wood oil, Vieth and Ehrmann found it necessary to change the chemical composition of the oil in such a way as to convert it into a resin-like substance, and this they achieved by converting sandal-wood oil into the neutral ester of an organic acid, preferably salicylic acid. They assert that the salicylic ester of sandal-wood oil is better than the other esters, such as benzoic or carbonic acid esters, in that it splits up in the organism, and liberates not only santalol, but also salicylic acid. The name santyl has been given to this salicylic acid ester of sandal-wood oil.

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[1] *Deutsche med. Wchnschr.*, Leipzig, 1906, No. 2.

Santyl contains 60 per cent. of santalol chemically combined with the salicylic acid in the form of the ester, and is asserted to pass through the stomach without causing any irritation, and then to *slowly* split up into its components, the gradual nature of the chemical change being very important, as it reduces any irritant action to such an extent that no kidney pains occur, and, besides, no sandal-wood odour is evident in the breath of the patient. With regard to the absence of kidney pains, I was very interested in a case which will be found quoted below (C. D.). The patient stated that he had suffered from pains in the region of the kidneys when taking sandal-wood oil some months previously, so that when I prescribed santyl for him I requested the resident medical officer to watch the case carefully, and to discontinue the santyl should the slightest sign of kidney trouble supervene. It was not found necessary to do this, as the man never developed a sign of his old pain (although he himself was always on the look-out for it, as it was difficult to make him understand that the liquid in the capsules was not sandal-wood oil).

Vieth's and Ehrmann's assertion that santyl is almost odourless and tasteless, I personally verified by placing on my tongue a drop of the oil, which I kept in my mouth for a short time; it has a very slight taste and odour, neither of which, however, is at all unpleasant.

The following cases are valuable, inasmuch as the patients were all in-patients, kept under observation from the beginning of their treatment by the remedy.

Although repeatedly questioned on the subject, not one of the cases treated (by me) with santyl objected to the taste of the remedy; none of them were nauseated either when taking the santyl or after its absorption; there were no eructations, there was no vomiting or diarrhœa, no gastro-intestinal irritation, no pain referable to the kidneys, no albuminuria. The curative—or, to speak more correctly in referring to any internal remedy for urethritis, the palliative—action is, as far as can be observed in the following cases, on a par with, if not superior to, that of copaiva or sandal-wood oil, the superior action, if any, being probably due to the liberation of the salicylic acid; to absolutely assert this, however, would probably necessitate more exhaustive observations; but, *cæteris paribus*, santyl recommends itself by having no nauseating taste, and by the fact that its administration, as far as has been proved, does not produce disagreeable or dangerous secondary effects.

As an adjunct to external treatment, or without external treatment, when the latter has to be suspended for a while, it should, after its advantages and properties have been strictly verified, be of great service in urethritis, but in my opinion I consider santyl, like any other internal so-called specific remedies for gonorrhœa, to be more adapted for the treatment of chronic urethritis (such as gleet) than of acute urethritis (first stage of gonorrhœa), as I mentioned elsewhere with reference to copaiva.

Case 1.—A. E., æt. 25. Admitted into the French hospital on 26th April 1906 for orchitis and epididymitis on the left side; cord not thickened. Six weeks previously the man had contracted gonorrhœa, which he had neglected, and was now only partially cured. Local treatment was applied to the testicle, and santyl ordered 20 minims *ter die.*

On 1st May the testicle and epididymis were very much better, in fact nearly well, consequently the discharge had increased. To continue santyl.

May 5.—Less discharge; patient questioned closely as to irritation, bad taste in the mouth, gastro-intestinal disturbances, lumbar pain; but he denies having experienced any of these. No albumin.

May 8.—Discharge nearly gone. Patient left the hospital on 10th May at his own request, having only a very slight discharge in the morning.

N.B.—This case is a good test, as no injections were used during the patient's sojourn in the hospital, only a saline purge was administered when he came in, so the good effect on the discharge could only have been produced by the santyl.

Case 2.—A. B., æt. 23. Came in with epididymitis, not very acute, on 1st May 1906. He stated that his discharge came on fifteen months before, and that he had been treated with injections and sandal-wood oil, but had never been cured; there was a considerable amount of discharge.

Santyl was ordered and local treatment for the epididymitis. On the second day, the epididymitis being nearly well, the resident medical officer gave him an injection of argyrol. On 5th May, the discharge having ceased, the injection was discontinued. The patient was still given santyl.

May 8.—Slight watery discharge to be seen on squeezing the penis.

May 15.—Still slight discharge.

May 18.—I gave orders for the patient to discontinue taking coffee in the morning, a point I had overlooked. The patient went out on 21st May, the discharge having ceased. During his stay there had never been any nausea, eructations, gastro-intestinal disturbance, or kidney pain.

Case 3.—C. D., æt. 22. Admitted for a gleety discharge and balanitis on 25th April. He stated that he had contracted gonorrhœa eighteen months previously, and had been treated with injections and sandal-wood oil. Santyl was prescribed in capsules, also appropriate treatment for the balanitis. He did not like the idea of the capsules, which he thought contained sandal-wood oil, as he had suffered from severe kidney symptoms whilst taking the latter drug. However, after explanation, he followed out the treatment.

May 1.—Still slight watery discharge. Balanitis much better. No nausea, eructations, gastro-intestinal pain, or kidney symptoms.

May 4.—Only very slight discharge in the morning on squeezing the penis.

May 8.—Pains in the joints. The resident medical officer had given a mixture containing pot. iodid. Discharge in the morning only very slight.

May 11.—Hardly any discharge. Stop santyl, but continue mixture.

May 15.—Resume santyl, and only take medicine twice a day. Still very slight discharge.

May 18.—Still slight discharge, though less. Give inj. rubra. Stop the morning coffee as in Case 2. Went out on 21st May. No discharge even in the morning.

Case 4.—C. G., æt. 19. Admitted 7th May 1906 with a thick purulent discharge and pain on micturition; had contracted gonorrhœa ten days ago. Santyl was ordered, also a mixture containing pot. bicarb. hyoscyamus, pareira and buchu.

May 11.—Inj. of argyrol ordered.

May 15.—Stop injection, as it has caused inflammation and ardor urinæ. As in Cases 2 and 3, I stopped the morning coffee; from this period the patient improved rapidly. Slight symptoms of cystitis supervened, for which, urotropin was administered, and he left the hospital on May the 28th, having only a very slight discharge as his sole symptom.

Case 5.—J. B., æt. 20. Admitted on 2nd July 1906, suffering from acute epididymitis on the left side; no thickening of the cord. There was a discharge from the urethra, which the patient stated had lasted for two months, but which (as is always the case) had very much diminished when the epididymitis set in. A saline purgative mist. alb. was prescribed three times a day, hot fomentations applied to the testicle, and fifteen minims of santyl ordered three times a day. Under the local treatment the acute inflammation of the epididymis gradually subsided. At the end of eight days the pain had greatly diminished; but, as is usual in these cases, the discharge from the urethra increased as the testicle got better. There being slight discomfort about the neck of the bladder when the urine was passed, a medicine containing pot. bicarb., tinct. hyoscyam., and inf. uvæ ursi was prescribed, the santyl being persevered with. Eight days afterwards the discharge was nearly well; glycerine of belladonna was being applied to the testicle. The testicle was quite well at the termination of another eight days, a very slight watery discharge remaining from the urethra, for which inj. rubra was given. The patient went out on 28th July perfectly cured.

There was not a sign during the whole treatment of any nausea, gastro-intestinal disturbance, or lumbar pain being caused by the santyl, neither could any sign of the drug be detected in the breath. It certainly produced a good effect on the urethral discharge, which it rapidly diminished; and the recrudescence of the discharge after an orchitis or epididymitis is always, in my opinion, most difficult to cure.

Case 6.—E. D., æt. 25. Admitted on 28th July 1806 with not very acute balanitis and also difficulty in getting back the foreskin, which was rather long. The appropriate remedies were applied for the balanitis, and in two days, it being then possible to see the meatal orifice, a discharge was seen to be proceeding from the urethra. I myself verified that the discharge came from the urethra, and was not simply that of the balanitis; the patient, moreover, acknowledged to having contracted gonorrhœa a fortnight previously. Santyl was prescribed, 15 minims *ter die*. Three days later the foreskin could easily be pulled back, and undoubtedly the drug had produced a very beneficial effect on the discharge, which had nearly disappeared. Inj. rubra was ordered, and the drug continued. The man left the hospital on 4th August. The balanitis was quite cured, and no discharge could be seen coming from the urethra; but the patient was given both inj. rubra and santyl to take home with him, and cautioned to leave off his treatment very gradually: I have so often seen the discharge return in quickly cured cases when remedies are suddenly discontinued. There was no intestinal, kidney, or lumbar disturbance in this case; no nausea, and no smell of the drug in the breath.

Case 7.—G. F., æt. 23. Admitted on 7th August, suffering from slight orchitis of the left testicle, the epididymis being principally affected. The gonorrhœa had been present for a fortnight. No thickening of the cord. Being absent from town, I did not see the patient till 14th August. He had in the meanwhile been treated by local fomentations. Ferri et quinine citras *ter die* had been prescribed, as the man was pulled down and anæmic, and a calomel purge was given on the day of admission. On the 13th the affection of the testicle was cured, only slight hardening of the epididymis remaining; so the resident medical officer had ordered an injection of argyrol, 2½ per cent. When I saw the case on 14th August there was a fairly abundant thick discharge. I prescribed santyl, 15 minims *bis die*; the injection to be continued, and a mixture of ferri tartratis and glycerine given internally. On 20th August no discharge could be seen, and the patient left the hospital on 21st August, with the same cautions as in Case 6.

During the treatment there was no intestinal, kidney, or lumbar symptoms, no nausea, and no smell of the drug in the breath. In this case the santyl had an excellent effect, but was certainly powerfully aided by the argyrol injection. The case also shows what I have personally always maintained, namely, that an injection can be ordered the instant the acute symptoms of orchitis have been brought under.

Case 8.—E. E., æt. 21. Admitted on 11th August with acute gonorrhœa, and a considerable amount of swelling and irritation of the prepuce. He had had the discharge for five days. Fomentations were ordered locally, and mist. alba prescribed. I first saw the patient on 14th August. The penile inflammatory signs had subsided, and I was glad to be able to try santyl in an acute case of recent origin. 15

minims *ter die* was ordered and regularly continued for six days. I then found the discharge much diminished and less thick. There had been no pain or ardor urinæ, the absence of which, as I have before very often pointed out, being most astonishing, considering the virulent-looking discharge. I ordered the santyl to be continued, and in addition prescribed inj. rubra (half strength), a saline purge to be taken in the morning when necessary. The patient left the hospital on 26th August, there being still a slight discharge. He was given the remedies, and cautioned like the two preceding cases. The santyl caused no intestinal, lumbar, or kidney disturbance; no nausea or smell in the breath.

Case 9.—L. B., æt. 34. Admitted late on 14th August for gonorrhœal rheumatism affecting the left knee-joint. For this, appropriate remedies were given, principally iodide of potash; hot compresses, and linimentum pot. iod. cum sapone were ordered locally. There was a yellowish-white, not very abundant, discharge from the urethra. For this the resident medical officer had given an injection of argyrol, 2½ per cent. On seeing the patient on 15th August I did not think it necessary to prescribe santyl, as the man was already being treated internally for the arthritis. The man's knee gradually got better; the discharge also diminished; but as it was still present on 25th August, I tried 15 minims *bis die* of santyl. The patient went out on 27th August, there being scarcely any discharge left. He was given his remedies, and cautioned in the same way as the preceding case. The drug produced no nausea or smell in the breath, and no intestinal, lumbar, or kidney disturbance.

The results of the administration of santyl in these cases are undoubtedly very encouraging. Its curative effect on the urethral discharge is certainly as powerful as that of any other internal remedy, whilst it has the enormous advantages of not disturbing the digestive functions and of not causing nausea or any odour in the patient's breath.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

The Hygiene of Mind. By T. S. CLOUSTON, M.D., F.R.S.E. London: Methuen & Co.

THIS excellent work is one of the earliest volumes of the New Library of Medicine, which aims at a discussion or exposition of medical matters of the highest importance by the foremost living authorities, and in such a way that the books should be "welcome alike to doctor and to patient, to statesman as well as to scientist." The Hygiene of Mind as here treated by Dr. Clouston entirely fulfils the purpose of the editor, for it "has a marked relation to personal and national life," and, while not neglecting "the purely technical aspect of the subject," it is mainly devoted to the application of the best scientific knowledge to practice. The conquests of medical science in the realm of theory are gathered together by a great expert of long experience and lucid power of exposition, and made the basis of a book which should illuminate medical practice, and help the intelligent layman and teacher to a wise guidance of life and education. There is no greater authority than Dr. Clouston on mental and moral health, and in this volume he deals in a masterly way with its development and conservation, and with the dangers to which at each period of life it is exposed. Evolution, heredity, physiology, psychology, sociology, medicine, all are made to converge on the central problem, and to contribute to an able treatise on the scientific wisdom of life. The author "sees life steadily, and sees it whole," and his book will open the eyes of many to the same great vision, and prepare the way at once to greater fitness and to a larger charity.

Three classes of men—the physician, the clergyman, the teacher—should specially appreciate and benefit by this book. The modern physician has learned that he cannot neglect the mental condition of his patient, no matter what his ailment may be. The minister is slowly coming to recognise that moral and spiritual life are deeply affected by physical conditions and environment. The teacher is to-day being taught to look upon hygienic school conditions, and healthy body and brain, as necessary considerations in every good scheme of education. The members of all these professions should read, mark, and inwardly digest this book on the Hygiene of Mind—for they will thereby broaden their professional outlook and interest, and the health and well-being of the community will benefit.

The social reformer, the educational administrator, municipal authorities, and parliamentary statesmen, whose problems are complicated by the mysterious but undoubted influence of mind upon body, and body upon mind, will find these problems simplified by a study of Dr. Clouston's book. And parents who would do their best for their children, both in the way of building up their physical, mental, and moral strength, and in guiding their choice of a career, will find practical assistance in this volume. The eighty pages specially devoted to the guidance of a child's growth from infancy to the close of adolescence, should be a sacred scripture to parents and teachers. As science advances, the greater should be the authority of the physician in education and the choice of a profession. How few parents have sense enough to realise this! Yet, as Dr. Clouston shows, these matters require "not only ordinary wisdom and common sense, but in many cases very special knowledge of health,—bodily and mental,—fitness, and temperament." Health defects, powers of resistance, bodily and mental conformation, hereditary tendencies and predispositions, should all be carefully considered in the choice of an occupation or profession. The family doctor could, from his special knowledge, warn off young men and women from certain trades and professions, and give indications towards others. A family history of consumption, for example, would warn against sedentary or indoor occupations; nervous constitution and heredity against the strain of examination; a lack of physical or nervous staying power would prevent certain young women from going into nursing, medicine, or teaching.

Dr. Clouston has much to say bearing upon the guidance of life, which should help men and women to adapt themselves to times of stress and strain, to avoid serious breakdown at the critical periods, and to grow old serenely and happily. The special difficulties and dangers of each period are dealt with in succession—and a prophylactic plan of campaign is sketched, which, if carried out, should contribute to increased and more widespread success in the modern battle of life.

Modern Clinical Medicine: Diseases of Metabolism and of the Blood, Animal Parasites, Toxicology. Edited by RICHARD C. CABOT, M.D. An Authorised Translation from "Die Deutsche Klinik," under the general editorial supervision of JULIUS L. SALINGER, M.D. London: Sidney Appleton.

THIS book is made up of a series of monographs by various German writers, most of them of European reputation and each a master in his own field. A glance at the list of contributors, von Noorden, Naunyn, Gerhardt, Ebstein, Ewald, Reiss, Ehrlich, von Leube, Litten, von Jaksch, and other equally eminent authorities prepared us for the excellence of the contents, and we were in no way disappointed. We have put before us the fruits of years of clinical and laboratory research by hundreds of workers striving to elucidate the mystery of what are still often called the "Diseases of Obscure Causation."

Although it would seem as if the veil were being lifted from certain of the diseases treated in this volume, much yet remains obscure, and the theories brought forward to explain their pathology are of the most ingenious description. As examples we need only refer to Grawitz's view that chlorosis is a neurosis, and to the chapter on Acromegalia where Benda states an excellent case for his hypothesis that the actual primary change consists in an enlargement of the soft parts and especially of the tongue, the bony enlargement being secondary and to be looked upon as an attempt at compensation, forming a support for the increased mass of the soft parts.

The first two chapters are concerned with metabolism. In the first, Weintraud deals with the scientific researches of internal medicine in the clinico-chemical laboratory and the hospital ward; in the second, von

Noorden gives us the application of over-nutrition and under-nutrition to the treatment of disease.

The article on obesity is the work of Ebstein. He holds that the thyroid treatment is not rational, because the loss of body-albumin is considerable, and we are in possession of dietetic rules for the treatment of obesity which are as successful as they are devoid of danger. The spa "cure" is denounced as unscientific and sometimes actually harmful, and Ebstein holds to his original opinion, that every "cure" of this kind, as well as every drug treatment, particularly by purgatives, is to be rejected in obesity.

The chapter on Addison's disease by Reiss is worthy of the highest commendation. All that is known of the disease is summarised, and the logical conclusion of the facts is shown to be that there are important links absent in the chain of reasoning that would explain Addison's disease as an affection of the adrenals alone. We note that the writer considers that cases without pigmentation ought not to be classified as Addison's disease.

Of particular interest at the present time are the article on Pentosuria by Blumenthal, and von Leube's description of Leukanæmia, a disease whose recognition we owe to him, and of which cases have been published recently in this country. Scurvy, hæmophilia, and purpura are considered under the heading of the "Hæmorrhagic Diatheses." The writer, Litten, gives very complete genealogical trees of bleeder families. He maintains that the individual purpuric diseases are not essentially different and only vary in degree, that is the "varieties" depend upon the intensity of the affection. Under scurvy he gives credit to "the excellent naval regulations in which England has shown itself superior to all seafaring nations."

Ewald's article on myxœdema contains special reference to organotherapy. He has found the administration of small doses of arsenic during thyroid feeding prevent symptoms of thyroidism.

The chapters on "The Animal Parasites of Man," by Peiper, and "Important Poisons and their Treatment," by von Jaksch, maintain the high standard of the previous sections.

A critical review of the book would be out of place, for it has undergone careful editing, and the editor's notes are always to the point. He has, for example, drawn attention to the omission of the high-colour index in pernicious anæmia, and the treatment of leukæmia and lymphadenoma by the X-rays. It would seem that in healthy adult males in America the number of erythrocytes to the cubic millimetre is "usually near 6,000,000, often above that figure." The translation has been made with skill and care, the book reads well, and an occasional split infinitive and a confusion in the wording of the sixth paragraph on p. 51, are the only defects we could find. "Carbonic acid" is the term used on more than one occasion when carbon monoxide obviously is the gas to which reference is made. To the drawing of the various absorption spectra of hæmoglobin no explanatory note is attached.

We venture to think that there is no member of the profession, however well informed, who will read this book without deriving from it new ideas and fresh facts of practical importance, and we can cordially recommend it alike to the senior student and to the practitioner.

A System of Dental Surgery. By the late Sir John Tomes, F.R.S. Fifth Edition. Revised and enlarged by Charles S. Tomes and Walter S. Nowell. London: J. & A. Churchill.

In considering this book, its genesis, of which the title-page gives an indication, must be taken into account. In 1845, the late Sir John Tomes, then Mr. Tomes, delivered a course of lectures on "Dental Physiology and Surgery" at the Middlesex Hospital. These lectures he published in book form in 1848, and they remained to constitute the standard English work on dentistry till 1859, when their author published the more extensive treatise which he called "A System of Dental Surgery,"—the first edition of the present work. In the second edition, published in 1873, Mr. Charles Tomes was associated as joint-author with his father. We may presume that filial piety has weighed with Mr. Tomes in determining him to preserve the form and arrangement of the original work almost unaltered. Yet it seems certain that it is to-day a quite impossible task for one man to write an altogether satisfactory text-book of the principles and practice of dental surgery. One man might edit such a work,—no one better than Mr. Tomes,—and he should associate with himself contributors selected for special knowledge of the branches of practice of which they were asked to treat. This is the method which our confrères on the other side of the Atlantic have adopted, with, we must acknowledge, a success which amply justifies them.

The first sixty pages of the book deal with teething and normal dentition. This, and indeed the same may be said of much else in the book, is anatomy and physiology, and is out of place in a system of dental surgery. There is a brief mention of diseases arising during teething,—but, this excepted, the matter of the first two chapters may be better studied in the author's "Dental Anatomy." The methods described for the regulation of teeth are rather old-fashioned in the main. A good deal of space is given to the description and illustration of Coffin's expansion plate, while Angle's work is dismissed in a paragraph as an old method which fell out of favour and has again come into use. Dr. Angle, doubtless, would argue this point, and we may leave it to him. No mention is made of cleft palate and its treatment by obturators and vela.

The chapter on the "Bacteriology of the Mouth" we can praise as presenting a most lucidly written, scientific, and satisfactory, though brief, résumé of the subject. But why does the author drag in at the tail of the chapter a description of antiseptic alveolar plugs of hard paraffin for use after extractions? It is true he offers no opinion as to their efficacy, but it would have been kinder and wiser to omit any mention of them. The chapter on "Dental Caries" is good, though space is still found for description of extinct and exploded hypotheses. When we come to the practical part of the book, it is impossible to be enthusiastic. The illustrations of instruments are few and poor; for example, there is no illustration of a dental engine, no word is said as to the superiority of the all-cord driven engine over the cable, and an obsolete form of the Bonwill engine-mallet is illustrated. In treating of pivots, crowns, and bridges, even though Mr. Tomes confines himself to the discussion of general principles, five pages seem inadequate. The treatment of exposed pulp is well and fully dealt with; the same may be said of alveolar periostitis. In writing of empyema of the antrum of Highmore, trans-illumination is said to be of little diagnostic value, no mention is made of Logan Turner's work on the "Anatomy of the Accessory Sinuses of the Nose," and the danger of infection of the frontal sinus is not pointed out and insisted on, as it surely should be. A large spear-head drill in the dental engine is still recommended for opening the maxillary antrum through the alveolar border, and we are told that lavage of the antrum may be performed by the patient filling his mouth with water and forcing it through the antrum by pressure of the cheeks. We hope no one will adopt this procedure, which is unscientific and dangerous. We demur to the statement that slight rheumatic affections of the joint of the jaw are little amenable to treatment; it would probably find little support at Bath or Harrogate. On page 529 we read: "In the human subject an undoubted case is yet wanting to show that ankylosis between the teeth and the jaw is under any circumstances possible," while on page 583 we are told that "such a condition is extremely rare, but there can be no doubt of its occasional occurrence."

To Edinburgh men the chapter on "Extraction of Teeth" will be interesting from the historical standpoint. For the arrest of hæmorrhage after extraction the authors depend on matico leaf. The use of perchloride of iron for this purpose is rightly condemned. Perchloride of iron should never be used, not because, as the authors state, it is an escharotic, but because the clot it forms is soluble again in serum. No mention is made of the cotton-wool, varnish, and alum plug, which is the routine and invariably successful treatment here. A fatal case is recorded, and its treatment described; this is intended, we hope, to be taken as an example of how not to do it.

If anæsthesia is treated of at all, it should be treated much more fully.

A good deal is said about pyorrhœa, but as regards treatment the writers' tone is pessimistic. Trichloracetic acid, a favourite remedy for this condition, receives no mention. Odontalgia and neuralgia are dealt with in a style which is reflective and reminiscent rather than illuminating. A capital account of what is known or has been written about odontomes will repay perusal by surgeons as well as dentists. Affections of the tongue receive attention to the extent of three pages and a half; here again omission altogether would be better than such excessive compression. The book is well printed and the proofs have been carefully read on the whole, though a few errors have escaped the reader's vigilance. On p. 179 we find "Irregularities of the permanent teeth in which both the crowns and the roots are out of the normal position" standing as a sentence, which is not permissible, as there is no predicate. On p. 268, "They may be used in many ways, of which Gram's method . . . being amongst the best" is a curious grammatical error. On p. 390 we find "maxtrix" for matrix; p. 391, "amadon" for amadou; p. 477, "plate" for palate; and on p. 515, "a perfectly loose sound tooth" should probably be "a perfectly sound loose tooth." Although Mr. Tomes' style is too deliberative, and his mental attitude too much of the non-committal type for a popular teacher, on the other hand, he avoids the flamboyancy and inaccuracy which so often disfigure and discredit much that is written on dental subjects. Within its limits, this book is a dignified and sensible contribution to the literature of dentistry.

Text-Book on Diseases of the Heart. By GRAHAM STEELL, M.D., F.R.C.P.
Manchester: Sherratt & Hughes.

DR. GRAHAM STEELL is so well known for his writings on cardiac affections that a special interest attaches to a text-book from his pen. This interest is enhanced by the fact that the book is published at a time when, as the author states, there is immediate prospect of a great advance in our knowledge of the anatomy, physiology, and pathology of the heart, which promises to lead to much improvement in the application of available remedies. Dr. Steell has adopted an unconventional, yet thoroughly sound and practical way of treating his subject. In place of following the usual custom and devoting a special chapter to the full consideration of each form of valvular lesion, he begins with an admirable description of the cardinal symptoms of heart disease in general. This is followed by a short statement of the clinical pathology of heart disease. The physical methods of examination are then described, this section being followed by an interesting chapter on the frequency of auscultatory signs of mitral stenosis based on a personal investigation of sixty cases. The author found that the pathognomonic presystolic murmur is the rarest, whilst the systolic, which has only an indirect relationship to stenosis, is the most common, the diastolic apex murmur standing between them as regards frequency. The instrumental examination of arteries and veins is discussed in a chapter which is based chiefly on the well-known work of Wenckebach and Mackenzie. A short statement is here given of the properties which are now assigned to the muscle fibres of the heart, namely, those of (1) Stimulus production, (2) stimulus conduction, (3) excitability, and (4) contractility; this being followed by a reference to the influences which modify each in a positive or negative direction, and to their effects as seen in medical practice. In this section the author has restricted himself to presenting a brief summary of present views on this new phase of our knowledge of cardiac affections. Angina pectoris, congenital diseases of the heart, affections of the pericardium, and septic or ulcerative endocarditis, are subsequently dealt with, after which a section of fifty-five pages is devoted to treatment. Nursing, diet, drugs, and management of the bowels are in turn discussed, the rules laid down for each being clearly expressed and thoroughly practical. The chapter on the Nauheim treatment leaves something to be desired. The author's statement that such treatment is naturally best carried out by those who make it their business, rather suggests that he has not formed a very high opinion of this therapeutic measure. As there is no doubt of the great value of this line of treatment in selected cases, it would have been an advantage to have had an authoritative statement as to the class of case for which it is suitable, with an account of the practical details in its management. In an appendix to the work, Professor Lorrain Smith gives an account of the volume of blood in relation to heart disease. We can cordially recommend Dr. Steell's book as giving an excellent and thoroughly practical account of the subject of which it treats.

NOTES ON BOOKS.

THE *Medical Annual Synoptical Index*, 1899–1904 (John Wright & Co., Bristol) is something more than an alphabetically arranged list of the articles which have appeared in the *Medical Annual.* It is a dictionary, inasmuch as it gives short definitions of recently introduced drugs and methods of diagnosis, and of unfamiliar diseases generally; it is a concise epitome of the progress of medicine during five years; and by the ingenious arrangement of the entries it will serve as a *memoria technica* and index of treatment for the busy practitioner. To possessors of the *Annual* the *Index* is indispensable, while those who have not the parent volumes will find their contents in brief in the Index. The labour of producing such a work as this is enormous, and we congratulate the editor on the way he has accomplished it.

The Climate of Lisbon (H. K. Lewis, London) is a little brochure by Dr. D. G. Dalgado, containing, in addition to a paper read at the last International Medical Congress, a variety of supplementary information regarding water supply, drainage, hotels, etc., likely to be useful to the prospective sojourner in Portugal. The winter climate is not, as has erroneously been stated, variable; Mont Estoril is a winter resort with many advantages, while Cintra, though a desirable residence in summer, is not adapted for wintering in. Dr. Dalgado's book should do something towards popularising the country of our ancient allies among travelling Britons.

Scarcely a year elapses without bringing an addition to the family of which the old *Braithwaite's Retrospect*, in its familiar navy-blue cover, was one of the earliest representatives. Annuals, Year-Books, Digests, *et hoc genus omne*, American and German for the most part, now form such a numerous progeny, that alone they would form a fair-sized library. One of the latest examples of this form of medical literature lies before us in the shape of *The Practical Medical Series of Year-Books* for 1906 (The Year-Book Publishers, Chicago; G. Gillies & Co., Glasgow), ten in number, dealing respectively with general medicine (2 vols.), surgery, diseases of the eye and ear, gynæcology, obstetrics, pædiatrics, therapeutics, public health and medical jurisprudence, anatomy, physiology, pathology, and bacteriology, and skin, venereal, nervous. and mental diseases.

The series is under the general editorship of Dr. Head, while the respective departments are under the care of twenty-two specialists, many of them of eminence. Medicine is in the capable hands of Dr. Frank Billings, and surgery in those of Dr. Murphy. The editor's aim is not merely to record new discoveries, but to represent the trend of opinion on old practices, and, so far as we can judge, the volumes successfully carry out these objects.

The volumes of the *Practical Medicine Series* are of convenient, almost pocket, size, are comparatively inexpensive, and are sold separately, as well as in sets—qualities which will commend them to many.

"General Medicine" occupies vols. i. and vi. of this series. The method of classfication adopted has been according to systems and diseases, and the result is satisfactory. A commendable feature is the absence of repetition, due to the care with which representative papers have been selected. The abstracts are drawn from a wide range of literature, American, English, French, German, Italian, and Russian journals having been laid under contribution. The French literature is, perhaps, hardly so representative as the rest, and some of the most important journals in that language scarcely appear in the list of references. If one may judge from the relative space devoted to them, the subjects which seem to have attracted most attention during the year have been disorders of the cardiac rhythm, typhoid fever, gastric disturbances, and metabolic diseases. We note with pleasure that not a few of the digests have been taken from the pages of this Journal. The work of compilation has been well done, and the result is both readable and useful.

The sixteenth edition of *Chavasse's Advice to a Mother* (J. & A. Churchill, London, 1906) has recently been published. The work has been revised and largely rewritten by Dr. T. D. Lister, and we can heartily recommend it as an admirable book to place in the hands of the mother of a family. Judicious instruction is given regarding the clothing, feeding, education, and ailments of infancy and childhood, while the information is imparted in language which the mother can hardly fail to comprehend.

In a revised and enlarged edition of *The Nature and Treatment of Cancer* (Baillière, London), Dr. Shaw-Mackenzie indicates the favourable results which may be obtained in the treatment of cancer by means of hypodermic medication with soap and ox-gall, chian turpentine, and trypsin. The author's logic is by no means always sound, and though his opinions are interesting they do not carry conviction.

The first part of *The Science and Art of Prescribing* (Kimpton, London) deals with prescription writing in general, incompatibilities, and the methods of administering drugs. It has been carefully put together by the authors, Dr. E. H. Colbeck and Dr. Arnold Chaplin, and should be useful to the student. The second and larger portion of the work—about 120 pages—contains little beyond an extensive series of formulæ. An appendix shows Dr. Robert Hutchison's analyses of the chief ingredients of the more important patent medicines.

To those who desire to study a small work on X-rays, Captain A. E. Walter's treatise (*X-rays in General Practice*, John Lane, London) can be recommended as a most excellent and serviceable handbook. Suggestions are given as to the choice of apparatus, and careful instruction as to its care and management. The author also discourses on the use of X-rays in diagnosis and treatment. The little book will commend itself to all who wish to become familiar with one of the most important of recent aids towards the relief of disease.

From the Scientific Press, London, comes a booklet entitled *Medical*

Homes for Private Patients, a Classified Directory with Lists of Medical Consultants and Specialists. It appears that in Scotland there are only eight consulting physicians, six consulting surgeons, and five gynæcologists. Some highly respectable family practitioners may find their names on the roll of fame.

We have received from the New Sydenham Society, Fasciculi xvii., xviii., and xix. of the *Atlas of Illustrations of Clinical Medicine, Surgery, and Pathology,* and they are of the same high standard as their predecessors. Fasciculus xvii. is devoted to a series of radiographic plates illustrative of fractures and dislocations of the upper extremity. These are from the Jones-Morgan collection, and are beautifully reproduced. The first seven plates in the next fasciculus depict various forms of elephantiasis met with in English practice, and are introduced to show that cases in no respect differing from tropical elephantiasis are met with in persons who have never been abroad. In an editorial note the opinion is expressed that the *Filaria sanguinis* is by no means essential to the malady, and quite possibly of no great importance. Another series of plates of some interest illustrates the "potato-like tumour of the neck"—a condition which has recently attracted some attention under the more accurate and definite term of "tumour of the carotid gland."

A second edition has appeared of the small handbook on *Anæsthetics,* by J. Blumfeld, M.D., in the "Medical Monograph Series" (Baillière, Tindall, & Cox, London, 1906). The book follows the usual lines, especially those of Dr. Hewitt, in describing the various anæsthetics and sequences. In ordinary cases, ether is regarded as the routine anæsthetic, the gas and ether sequence being the ideal in the hands of the expert anæsthetist. The choice of an anæsthetic in special cases, the dangers of anæsthesia, and other matters, are discussed. There is a tendency, here and there, to refer the reader to larger works for facts and diagrams; but the book, being free from unnecessary historical and literary padding, gives in compact form all that is required by the ordinary student or practitioner.

Dr. Luke is to be congratulated on the appearance of a third edition of his *Guide to Anæsthetics* (Wm. Green & Co., Edinburgh and London, 1906) within a year of the publication of the second. The chapters on the administration of general anæsthetics have been brought well up to date. Due emphasis has been laid on the dangers attending the administration of ethyl chloride, which extended experience of its use has so clearly shown, while the special risks of chloroform anæsthesia in acute infective conditions in children, brought out by Beesley's recent work on acetonuria, are also noted. The sections devoted to local anæsthesia, although somewhat brief, should prove of use to students and practitioners; but the brief notice of spinal anæsthesia, and the sweeping condemnation of it which Dr. Luke indulges in, suggest that he has not altogether succeeded in making that "close and unprejudiced study of the pros and cons of spinal anæsthesia" to which he lays claim, for the sections dealing with it are the least informing part of an otherwise excellent practical manual.

The fact that this book—*Dorland's Illustrated Medical Dictionary* (Saunders, Philadelphia and London, 1906)—has been several times reprinted, besides having gone through three editions since its appearance in 1900, is strong evidence of its excellence and popularity.

The present edition has been brought up to date by the introduction of many new terms and expressions, and also by amplification of the various tables, which are a most useful feature of the work. We can thoroughly recommend the volume as a complete and accurate dictionary, covering the whole field of medicine and allied sciences, which every medical practitioner will find to be an invaluable aid and book of reference.

Report on the Health of the City of Liverpool during the Year 1905.—Dr. E. W. Hope's annual report on the health of Liverpool for the year 1905 is a large and interesting volume, extending to about 250 pages, and containing much valuable statistical matter. A specially interesting retrospect of the sanitary condition of the city is given. From this survey of the sanitary history of Liverpool we learn that in 1841 upwards of 20,000 of its total population of 223,000 lived in cellars. These cellars were from 10 to 12 ft. square, generally flagged but frequently having only bare earth for a floor, and sometimes less than 6 ft. in height. There was frequently no window, so that light and air could gain access only by the door, the top of which was often no higher than the street level. They were generally damp from defective drainage. There was sometimes a back cellar used as a sleeping apartment, and this derived its light (!) and air (!) from the front apartment. The cellar-dwellers were absolutely without out-offices or place of deposit for refuse matter. The system of scavenging and cleaning of streets inhabited by the poorer classes was defective in the extreme, being imperfectly performed by paupers. None of the streets were visited oftener than once a week, and frequently a much longer period intervened. The courts were never visited by the public scavenger at all. All this is in very marked contrast to the present day, and one can scarcely realise that the description is that of a state of matters which existed only sixty-five years ago.

The Sigmoidoscope, by P. L. Mummery, B.C., F.R.C.S. (Baillière, London, 1906), is a description of the pneumatic sigmoidoscope, its value, and the method of employing it. It will, we think, be generally admitted that the sigmoidoscope ranks with the cystoscope, the laryngoscope, and the ophthalmoscope as an aid to scientific diagnosis, and therefore to scientific treatment. By its aid the rectum and the greater part of the pelvic colon can be visually examined, and colitis, ulceration, neoplasms, and other conditions, which may present similar symptoms, can be differentiated. A point, however, which we have not seen discussed in any work on this subject is the possibility of carrying up infection from a pathological rectum. The pneumatic sigmoidoscope with its contained electric lamp, passed with the aid of sight and with the bowel ballooned in front, is much safer and more effective than Kelly's instrument, especially where the colon wall is ulcerated and weak. There is nothing specially original in this book, as most of the statements can be found in one of the large works, such as Tuttle's, on this region of the body; but men who have no time to study such volumes may be induced by this handy little book, which can be read in an hour, to take advantage more frequently of the scientific assistance of the sigmoidoscope.

In *Tuberculosis: its Origin and Extinction*, by W. P. Turner (A. & C. Black, London, 1906), the author explains how in his opinion the disease can be absolutely stamped out. His theory can be briefly stated thus: The organism exists in spore form in certain grasses, develops into its bacillary form in cattle, which form "the intermediary indispensable host," and from them is acquired by man by ingestion only, never by inhalation. Domesticated cattle become tuberculous because in their shelters the bactericidal actinic or ultra-violet rays of the spectrum do not reach them. Let all buildings in which cattle are kept possess glass roofs, the glass being spectroscopically examined to determine that actinic rays can freely pass through, and tuberculosis will be "swept away at one fell swoop." Inconvenient facts and doubts are easily surmounted. The author "inferentially argues" the existence of the tubercle spores; "expects to find" that phthisis in Japan, where the conditions necessary for the theory do not exist, is due to "another species of germ"; and "ventures upon a sporting guess" that avian tuberculosis is actinomycosis. His conclusion *may* be correct; but, as it is based upon a line of reasoning containing a series of logical fallacies which would turn grey the hair of any lecturer on logic, the only possible proof of its correctness would be a successful experiment with the glass roofs. Readers might, we think, not unfairly have expected the author to make this "simple experiment" before hurling the theory at their heads.

The opening of the new Infirmary in Newcastle forms an appropriate occasion for the publication of *The History of the Newcastle Infirmary*, by one of its consulting surgeons, G. H. Hume, D.C.L., M.D., F.R.C.S.Ed. (Andrew Reid & Co., Newcastle-upon-Tyne, 1906). It began in 1751 with seven in-patients, a house being rented for the purpose: the new buildings just completed will accommodate 400 patients. In its career the hospital has encountered all the usual problems. From the outset patients took advantage of the charity who could have afforded to pay for their cure. In 1773 its physicians and surgeons were disputing as to whether the latter might prescribe internal medicines for their patients. Erysipelas and pyæmia were rampant, and the views of their etiology were curious, for they were attributed sometimes to the noxious effluvia from wet wood after scouring of the ward floors, or, in the absence of any other obvious cause, to "long continuance of severe weather." We read that three tons of linseed meal were used in a year, mostly for the poulticing of wounds. Antiseptic principles were eventually introduced by a house surgeon, who had been trained under Lister in Edinburgh. Though, of course, chiefly of local importance, the book is of interest even to the general reader.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Heart-Block: Recent Anatomical and Physiological Work.

It is now an established fact that the stimulus to the contraction of the ventricles passes from the auricles to the ventricles by a bundle of muscle fibres—the auriculo-ventricular bundle of Kent and His. When from any cause, such as a lesion of this bundle, the passage of the impulse is prevented, the ventricles no longer beat synchronously with the auricles, but pursue an independent rhythm. To this state of matters the term "heart-block" is applied. The nature of this condition, particularly in relation to Stokes-Adams' disease, has been the subject of much fruitful study during the past two years, and a great deal of new light has thereby been thrown on disturbances of the cardiac rhythm.

To Tawara (*Brit. Med. Journ.*, London, 1906, May 5 and October 27) belongs the credit of having fully traced out the *ramifications of the auriculo-ventricular bundle.* It begins in front of the coronary vein, and passes forward on the right side of the interauricular septum to a nodal point just above the attachment of the mesial flap of the tricuspid valve. Thence it passes down towards the interventricular septum, dividing into two main branches, one for each ventricle. The fibres of this bundle and its branches differ histologically from the rest of the heart muscle in showing a smaller development of sarcoplasm and a more reticular arrangement, while they are isolated from the subjacent cardiac muscle by a connective tissue sheath. They are more conspicuous in the sheep and calf than in man; Purkinje's fibres are, in fact, only a specially well-marked variety of the fibres in question. Tawara's researches extended to the hearts of dogs, cats, sheep, rats, rabbits, guinea-pigs, and pigeons, and in all the general arrangement of the fibres was analogous. The nodal point, or "knot" mentioned above, consists of a confused plexus of very fine muscle fibres. These communicate, on the one hand, with equally delicate fibres running into the auricular wall, and, on the other, pass abruptly into the larger fibres of Purkinje, which form the ventricular system. In man the right main band of the ventricular system is narrow, and remains so until it reaches and enters the papillary muscles; the left main trunk is wider and broadens out, finally dividing into two or more branches entering the anterior and posterior papillary muscles. The left main trunk can often be seen, particularly in the hearts of elderly persons, as a white strip about $\frac{1}{4}$ in. broad below the pars membranacea. Thus there is in the ventricles a sub-endocardial network of conducting fibres which are insulated from the rest of the heart muscle by a connective tissue layer. They ultimately become directly continuous with the heart muscle, and at this point lose their connective tissue envelope. In animals these conducting fibres, instead of, as in man, passing down as strongly marked trabeculæ towards the papillary muscles, stretch across the cavity of the ventricle as strands running directly to these structures. This arrangement is occasionally seen, as an abnormality, in man; the so-called tendons traversing the ventricles, to which the occurrence of murmurs has been ascribed, are only aberrant branches of the conducting system. The whole system serves to co-ordinate the action of the various chambers of the heart, and to carry the impulse from auricles to ventricles.

Neglecting for the time the typical heart-block caused by lesion of the main auriculo-ventricular bundle, the effect of disease involving the subsidiary divisions requires consideration. Aschoff of Freiburg ("Die heutige Lehre v. d. pathologisch-anatomischen Grundlagen d. Herzschwäche," Jena, 1906) attempted to ascertain whether there is any anatomical basis for the feebleness of the hypertrophied heart muscle, which is so frequently met with in cases of heart disease, nephritis, and arterio-sclerosis. It was during the course of this inquiry that Tawara was instigated to carry out the research summarised above. The problem to be solved was, *Why an hypertrophied heart, in spite of the enormous increase of its muscle, so readily falls a victim to gradual exhaustion when even slight demands are made on it?* The Leipzig school teach that this is due to progressive myocarditic changes. Aschoff and Tawara examined 112 hearts from cases of rheumatic valvular disease, nephritis, arterio-sclerosis, diphtheria, typhoid, tubercle, etc., with somewhat unexpected results. Only in one disease—diphtheria—did they detect marked parenchymatous and interstitial changes. In valvular disease the myocardial changes were so trifling that they could not have led to failure of compensation. The great majority of the indurations found in valvular disease are due to anæmic infarcts. In true rheumatic cases characteristic specific miliary nodules in the sub-endocardial and interstitial connective tissue were commonly found, but they were too small to affect the heart muscle injuriously. In typhoid fever they did not find the myocardial changes which are usually stated to occur, nor in scarlet fever, measles, or tubercle. Even in arterio-sclerosis indurations large enough seriously to damage the heart were rare. Since, therefore, the myocarditic theory of the enfeeblement of an hypertrophied heart falls, two possibilities suggest themselves—(1) Either the work given the hypertrophied muscle to do is so excessive that the organ gradually fails to respond; or (2) the indurations, though slight, involve muscle fibres of special importance—such fibres, for example, as the auriculo-ventricular bundle and its ramifications as elucidated by Tawara.

Now the conducting fibres do not hypertrophy along with the rest of the heart; hence it is conceivable that a stage might arrive when they were inadequate to subserve the increasing bulk of the muscle. Again, the specific rheumatic lesion involves chiefly the sub-endocardial region, and sometimes actually the connective tissue sheath of the conducting fibres; if it should be very widely spread it might cause irregularity, or even weaken the heart. In Aschoff's opinion, however, the ordinary lesion is too small to have any such effect. His general conclusion is that, except in diphtheria, cardiac failure is in the vast majority of cases in no way dependent on myocarditic changes. While the nervous system may play a part in producing it, the chief cause is functional damage caused by increasing demands being made on the power of the heart with which it cannot cope—demands which may originate either in progressive valvular mischief, or outside the heart altogether.

Physiology of heart-block.—The contraction wave arising in the venous end of the heart suffers an appreciable delay of one-fifth of a second in crossing the auriculo-ventricular junction. The most recent researches on experimental heart-block in animals are those of two independent observers, Erlanger and Hering. Erlanger (*Brit. Med. Journ.*, London, 1906, October 27) adopted the method of clamping the auriculo-ventricular bundle, and subjecting it to varying degrees of compression. Slight pressure causes a progressive lengthening of the intervals between the contractions of the auricles and those of the ventricles (the auriculo-ventricular period), until eventually the ventricles fail to respond to one of the exciting waves. In the next cardiac cycle, owing probably to the increased excitability of the rested ventricular muscle, the auriculo-ventricular period is unusually brief, lengthening out as before in the succeeding cycles. By progressively tightening the clamp so that a ventricular beat falls out more and more frequently, we get such series as 8 : 1, 7 : 1 . . . 2 : 1, a point at which only every second wave stimulates a ventricular contraction. On further compressing the bundle, only every third or fourth wave stimulate a ventricular contraction, in other words, rhythms of 1 in 3, 1 in 4 . . . occur. These stages of partial block are explained by the progressively increasing irritability of the resting ventricular muscle eventually attaining such a pitch that a contraction is initiated even though only a fraction of the normal stimulus reaches it. Complete dissociation of the beats of the auricles and ventricles usually takes place when a rhythm of 1 in 3 is reached. It is, however, practically impossible to recognise when compression has reached such a stage as to prevent absolutely the passage of impulses. The reason for this is, that the ventricles possess the property of spontaneous rhythmicity, and when the stimuli from the auricles fall below a certain level, the ventricles begin to pursue their own rhythm, regardless of the ineffective stimuli.

Action of the cardiac nerves.—Having thus proved that lesion of the auriculo-ventricular bundle is the cause of heart-block, it is possible to determine the exact influence of the cardiac nerves on the different chambers of the heart. Stimulation of the accelerator nerve of a heart in a condition of "block" increases the rate of both ventricles and auricles. Stimulation of the vagus, on the other hand, only inhibits the auricles.

Sudden artifical heart-block.—The typical sequence of events is as follows:—When the clamp is tightened, the ventricles stop, the auricles continuing their beat undisturbed and distending the relaxed ventricles. After a pause lasting up to eighty or more seconds, the ventricles contract spontaneously, and take up their own slow rhythm. Sometimes the ventricular pause following clamping is so long that respiratory convulsions ensue. Partial block can be converted into complete block by (*a*) stimulating the auricles to beat more rapidly, which results in a less effective, though more frequent, auricular wave; or (*b*) stimulating the vagus so as to inhibit the auricles, and thus check the auriculo-ventricular impulse altogether. In either case the ventricles may cease beating temporarily until their own inherent rhythm asserts itself.

Analogies between experimental heart-block and heart-block in man.—Heart-block in man is due to disease of the auriculo-ventricular bundle; in animals to pressure, etc. In both animals and men all grades of complete and partial block have been observed—2 : 1, 3 : 1, 4 : 1 rhythms have been recorded clinically. The remarkably constant pulse of heart-block in man shows that the vagus action on the ventricles is slight. Atropine has no effect on the pulse rate, though it affects the auricles in the usual way. In Stokes-Adams' disease stoppage of the ventricles occurs.

Electro-motive changes in heart-block.—It has occurred to two independent observers, Gibson and Einthoven, to investigate the function of the heart by studying its electro-motive changes, and their results appeared almost simultaneously. Gibson (*Brit. Med. Journ.*, London, 1906, July 7) employed Lippmann's capillary electrometer, connecting the acid with the basal region of the præcordia of a case of heart-block, and the mercury with the apical. The usual diphasic movements of the mercury were seen preceding the apex beat, and between these smaller oscillations were also detected, which, when magnified by the projection microscope were found also to be diphasic and evidently due to auricular contraction. They numbered three or four to every ventricular beat, corresponding with what had already been determined by tracings and examination with the fluorescent screen.

Einthoven's work (*Arch. neerl. d. sc. exactes*, Harlem, 1906, Ser. 2, tome xi.) was on a more elaborate scale; the recording apparatus employed was in the physiological laboratory, while the patients were in the hospital at some distance off. For the ingenious manner in which he overcame the difficulties of induced currents in the connecting wires from the neighbouring telephone system, the original must be referred to. He employed a specially arranged galvanometer, the movements of which were recorded on a travelling photographic plate, on which, too, ordinates and abscissæ, representing electric potential and fractions of a second respectively, were simultaneously recorded. He thus obtained tracings, which he called electro-cardiograms, or, when the patient is at a distance, telelectro-cardiograms. These tracings vary somewhat according to the parts of the body with which the wires are connected—left hand to right hand, left hand to left foot, etc. In general, however, they agree in showing five curves or oscillations, of which the first is auricular, the remainder being due to the contraction of the ventricles. The tracings obtained in this way are, of course, quite beyond comparison with any ordinary tracings got by tambours, etc. In cases of hypertrophy of the right ventricle the upward ventricular curve is greatly exaggerated: in aortic cases, when the hypertrophy chiefly involves the left ventricle, the exaggeration of the ventricular curve is reversed—in a downward direction. In mitral stenosis, with hypertrophy of the left auricle, the auricular curve is much larger than normal. In the tracing from a case of congenital heart disease the ventriculo-systolic curve was reduplicated —a state of matters found in no other condition. Electro-cardiograms from patients suffering from intermission of the pulse (*e.g.*, post-typhoid) showed, not an absence of wave, but an exaggerated and abnormal oscillation corresponding with the intermission. The cardiograms also bring out the fact that extra-systoles yield atypical curves. The auriculo-ventricular interval in these tracings is about 0·175 second. In a series of tracings from a case of heart-block, the complete dissociation of the auricular from the ventricular oscillations is well brought out. Without reproducing the tracings, it is difficult to give an idea of this paper. The method is obviously so complicated as to require the co-operation of a physiologist and a clinician for its execution, but it certainly seems as though tracings obtained in this way might give information quite unattainable otherwise.

SURGERY.

UNDER THE CHARGE OF

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Complete Dislocation of the Lower Cervical Vertebræ.

It has been assumed that complete dislocation of the lower cervical vertebræ is invariably fatal, as the associated crushing of the cord is believed to be incompatible with life. F. Steinmann (*Arch. f. klin. Chir.*, Berlin, Bd. lxxviii. Heft 4) has gone through the literature, and has found that a not inconsiderable number of cases are recorded in which recovery took place; and he has personally observed a case in which the diagnosis was established by X-ray photographs.

In reviewing all the cases, the author draws attention to the following points:—The cause is always forced flexion by a blow or fall on the head, or a blow on the neck. In most cases there is unconsciousness, which sometimes lasts for as long as two days. The patient complains of violent pain, due to the pressure of the nerves emerging from between the displaced vertebræ. Pressure and attempts at movement also cause severe pain. The stiff attitude of the head and neck is characteristic; the chin, which is sunken on the chest, can only be slightly raised therefrom. The stiffness of the neck tends to disappear even in cases where reduction has not been effected, as the displaced vertebræ become fixed by bony fusion. Other signs of the dislocation are: an angular bending of the cervical spine, a projection in the neck, and an abnormal distance between two spinous processes. The palpation of the vertebræ from the mouth is of doubtful value. In cases which survive, it is probable that the anterior and posterior longitudinal ligaments are not torn. Other accompaniments, such as compression of the gullet, fracture of the sternum, and disturbances of respiration through paralysis of the laryngeal nerves, are occasionally met with.

In spite of the presence of serious symptoms, the condition is sometimes overlooked, and yet its recognition is of great importance, as early reduction is the only satisfactory treatment. Inasmuch as it is often difficult to distinguish between fractures and dislocations in this region, the attempts at reduction must be so planned that even if a fracture is present no harm will result.

The author recommends, in the first place, making extension in the long axis of the spine, in order to disengage the articular processes from one another. A gentle movement backward of the upper part of the cervical spine is then usually sufficient to allow the articular surfaces to return to their normal relationship. Reduction is easier under an anæsthetic. In unreduced cases of old standing, operation may prove of service.

CEREBRAL DECOMPRESSION.

SPILLER and Frazier (*Univ. Penn. Med. Bull.*, Phila., 1906, September) record an experience of fourteen cases in which palliative operations have been performed for the relief of intracranial tension in cases of tumour of the brain. In a brief résumé of the history of this operation, they state that the earliest records of it were operations performed in Edinburgh by Lister and Annandale, early in the seventies. Since then the operation has become a recognised procedure, and all are agreed as to the benefits it confers on the patients in relieving pain, arresting the development of optic neuritis and resulting blindness, and in preventing the mental deterioration which accompanies the growth of intracranial tumours. Jaboulay has found the operation of more benefit in tumours of the cerebellum and adjoining parts than in tumours of the cerebrum. There is some difference of opinion among authorities regarding the necessity of opening the dura in these palliative operations. Von Bergmann, Risien Russell, and others hold that the dura should be opened to admit of the escape of cerebro-spinal fluid, on which the success of the operation, in their opinion, depends. The authors of this paper take the opposite view, and show tracings to demonstrate that the dura is capable of stretching sufficiently to afford adequate relief of tension when the overlying bone has been removed. In their own experience they have not been able to note any radical difference in the results between those cases in which the dura was either left intact, or, if incised, was closed immediately afterward. They are entirely opposed to allowing palliative operations to take the place of an attempt to remove the tumour, as recommended by Codman.

In the opinion of the authors, palliative operations should be performed early in every case in which symptoms of brain tumour are pronounced, and before optic neuritis has advanced far, especially when syphilis is improbable, or antisyphilitic treatment has been employed. Partial removal of a tumour, especially a glioma, they consider a questionable procedure. Palliative operations neither retard nor hasten the growth of the tumour. They do not take the pessimistic views of many writers as to the inoperability of cerebral tumours, and point out that the statistics on which these unfavourable opinions are based are those of post-mortem cases where the tumour has been the cause of death. There should be no immediate risk to life from a decompressive operation.

Treatment of Acute Inflammatory Affections by Bier's Passive Congestion Method.

A discussion on this subject took place at the German Surgical Congress (*Rev. de chir.*, Paris, 1906, October), and the general trend of opinion seemed to be strongly in favour of the method. Sick of Hamburg, for example, gave his experience of 250 cases in which he had employed it, almost always with good results. He emphasised its value in diminishing pain, in effecting a cure rapidly, and with the best functional results. He points out, however, that it is only suitable to hospital practice, as the patient must be kept under constant observation. Stich of Breslau had obtained excellent results in whitlow and phlegmons of the tendon sheaths. He suggests that the method should be employed as a prophylactic measure in wounds in which infection is suspected. Bardenheuer of Cologne is an enthusiastic advocate of the method, and has found it very efficacious in inflammations of the tendons, in acute forms of arthritis, in suppurative periostitis and osteomyelitis, and in all varieties of phlegmons. Lexer of Königsberg limits its use to cases in which the process is circumscribed and the fever moderate. Perthes of Leipzig considers it an advantage to make small incisions before inducing the congestion, as he believes that it acts essentially by aspiration. Stettiner of Berlin also attaches more value to the aspirating effects than to the stasis induced; and Bier himself mentioned that in 1100 of the 1500 acute inflammations treated by him, aspiration had been employed.

There seems to be general agreement that the method is not so successful in diabetic subjects, in streptococcal infections generally, and particularly in erysipelas. Croce and Stich do not recommend it in osteomyelitis, and the former has found it painful in whitlow. Haasler of Halle, as a result of comparative observations, does not find himself able to attach any higher value to Bier's method than to the older methods of treating advancing phlegmons.

Cases of Spontaneous Intracranial Hæmorrhage associated with Trigeminal Nævi.

Harvey Cushing (*Journ. Am. Med. Ass.*, Chicago, 1906, July 21) brings forward three cases of trigeminal nævi which seem to support Bärensprung's views on the topographical distribution of nævi. Bärensprung pointed out a close correspondence with the skin fields sensitised by one or more branches of the trigeminal nerve, and the localisation of cutaneous nævi. So close is the correspondence, that it suggests that a pre-natal lesion occurring in the Gasserian ganglion, or in one of its component parts, may have been responsible for producing the defect.

Case 1 was a child æt. 4, with extensive nævus involving the right trigeminal territory. Right intracranial hæmorrhage occurred spontaneously, and led to contralateral spastic hemiplegia. A second hæmorrhage led to hemianopsia and epilepsy. The autopsy revealed unusually vascular meninges on the right side, suggesting a nævoid condition similar to that of the skin. Over the right occipital lobe the convolutions were atrophied, and the Gasserian ganglion was extremely small.

Case 2 was a child æt. 5, with birth-mark limited to the ophthalmic division of the right trigeminal. Intracranial hæmorrhage occurred, suddenly resulting in the production of epilepsy. Operation, after ligation of the external carotid, revealed a highly vascular condition of the dura corresponding to the nævus.

Case 3 was a child æt. 8, with an extensive nævus involving the right trigeminal territory. Right intracranial hæmorrhage occurred, leading to contralateral spastic hemiplegia, idiocy, and epilepsy.

These nævi, the author considers, may be regarded as a result of some process, a congenital defect or intra-uterine lesion, which has primarily affected the ganglion in its sensory root. Had there been no nævi, these cases would have been diagnosed as spastic hemiplegia of encephalic origin. His experience of "birth palsy" leads the author to think that most instances of infant hemiplegia dating from birth are secondary to intracranial hæmorrhage accidental to parturition. Some of the infantile cases, also, he believes to be due to cortical bleeding from ruptured vessels. Cushing comes to the following conclusions:—(1) That vascular nævi on the face show a tendency to conform to the distribution of one or more of the main trigeminal branches. (2) That these cutaneous nævi may be associated with hypertrophy of the deeper tissues of the face, with an enlargement of the eye, and with the presence of a corresponding nævoid condition of the dura mater. (3) That the dural nævus may lead to a spontaneous hæmorrhage during infancy. (4) Absorption of clot may lead to cortico-dural adhesions, which in favourable cases may be separated by operation, provided the carotid be ligatured to control the hæmorrhage.

APPENDICITIS IN INFANTS.

In reporting a case of acute appendicitis in a child, 11 months old, Kérmisson and Guimbellot (*Rev. de chir.*, Paris, 1906, October) take the opportunity of reviewing the published records of this condition in infants below the age of 2 years. They have collected twenty-six cases,—nine in the first year, and seventeen in the second year. The mortality has been strikingly high. Nineteen patients died, and only seven recovered, and all of these seven were over 18 months. Operation was performed in nineteen cases,—seven during the first year, all fatal, and twelve during the second year, with seven recoveries.

It would therefore appear that appendicitis is not so rare during the first two years of life as is generally supposed. It is always very acute, and, as the above figures show, the prognosis is grave. The recoveries have all followed operation performed during the acute stage, the necessity for operation being imperative.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF
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The Influence of Vaginal Douches on Puerperal Morbidity.

Baisch (*Arch. f. Gynäk.*, Berlin, Bd. lxxix. Heft 2) discusses the value of antiseptic douching at the onset of labour. The investigations were made on patients who had been admitted to hospital before the onset of labour. In all cases gloved hands were employed, and the external parts were thoroughly cleansed before douching. Of 1000 cases, 500 had a douche of sol. hydarg. perchlor. (1 to 1000), with the following results:—Douched cases, 12 per cent. had a rise of temperature; non-douched cases, 8 per cent.; 127 of the latter were not examined internally, and of those 8·6 per cent. had an elevation of temperature. The average duration of the rise was, in both groups, about three days. Those figures show that preliminary douching rather increases the tendency to puerperal fever. Bacteriological examination of the lochia further showed that perchloride of mercury does not destroy the streptococci causing puerperal fever. The non-douched cases showed a tendency to a much less virulent rise of temperature as compared with other class.

Hebotomy.

A. H. Bill (*Surg., Gynæc., and Obst.*, Chicago, 1906, July) has collected records of 157 cases, with eight deaths. Five of the fatal cases were due to sepsis, one to anæsthesia, one to typhoid fever, and another to thrombosis of the ovarian and renal veins. Bill gives the following as advantages of this operation over Cæsarean section:—(1) The peritoneal cavity is not opened, nor the genital tract involved; (2) greater simplicity; (3) it does not interfere with future labours. Of complications, however, which may be met with he mentions vulvar hæmatoma, bladder injuries, and thrombosis of the veins of the legs. Bill further thinks this operation could be combined with induced premature labour, but that it should not displace the latter operation.

Ascites and Ovarian Dermoid.

Guibal (*Ann. de gynéc.*, Paris, 1906, August) reports the following case:—P., æt. 56, was admitted to hospital on account of marked ascitic distension of the abdomen. This had come on suddenly without any constitutional or local disturbance. The abdomen was aspirated twice; over 30 pints of lemon-coloured fluid being drawn off. There was no evidence of renal, cardiac, or hepatic disease, but a movable, smooth tumour the size of a lemon could be felt on each side of the uterus. Ovariotomy was performed; two unilocular tumours, filled with long brown hairs, and sebaceous matter, being removed. Fourteen months after operation there was no recurrence, and the patient's general health was perfect.

SUBCUTANEOUS EMPHYSEMA DURING LABOUR.

Gilles (*Province méd.*, Lyon, 1906, August 25) reports the following case:—A primipara, æt. 30, after about three hours of a second stage, complained of a tearing sensation in the thorax, followed by great distension of the skin of the face and neck. This was accompanied by loss of voice and some difficulty in swallowing. Labour was aided by forceps, the emphysema soon disappeared, but there was evidence of crepitation on palpation for some time.

ABSORPTION OF A FIBROID TUMOUR IN BROAD LIGAMENT DURING PREGNANCY.

M'Arthur (*Intercol. Med. Journ. of Austral.*, Melbourne, 1906, July) reports the following case:—P., æt. 30, four months pregnant, came under observation on account of severe pain in the left iliac region, of a fortnight's duration. There was found an elastic tumour in the left broad ligament and Douglas' pouch. This was regarded as an abscess, and was aspirated. No pus escaped, and the mass felt through the vagina resembled an ordinary fibroid. An exploratory incision was made, when the tumour was found to be as large as a fœtal head, between the layers of the broad ligament, and evidently growing from the cervix and lower uterine segment. It was decided to allow pregnancy to go on to full time, and deliver by Cæsarean section. Three weeks before full time no tumour could be found. There was some hæmorrhage with the onset of labour, the cervix was dilated by a bag, and a fully developed child weighing 7 lbs. was delivered.

TORSION AND LACERATION OF THE UTERUS BY A PEDUNCULATED FIBROID.

Reeb (*Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1906, July) reports the following case:—P., æt. 62, when engaged gathering firewood, showed symptoms pointing to torsion of a pelvic tumour. The uterus was found to have undergone axial rotation to 360°, caused by a large pedunculated subserous fibroid. The bladder was not involved, but the anterior wall of the uterus was torn through, so that uterine and peritoneal cavities communicated. The uterus was removed above the cervix, and the patient made a good recovery.

MENSTRUAL FEVER AND MENSTRUAL SEPSIS.

Riebold (*Deutsche med. Wchnschr.*, Leipzig, 1906, July) has made observations on 2000 cases. He finds in many cases that there is a rise of temperature during menstruation, coming on during the third or fourth day. The fever and leucocytosis during this time are due to absorption by the uterus of toxic materials. The blood and mucus in the uterine cavity forms a good culture medium, the protective power of the vaginal mucus being absent. A similar toxin may produce skin and nervous affections which occur during menstruation, as erythema, urticaria, herpes zoster, and neuralgias.

Observations on Fibroma Uteri.

C. Jacobs (*Bull. Soc. belge de gynéc. et d'obst.*, Bruxelles, tome xvi. No. 4) has operated on 633 cases of fibroma uteri. He believes it is a mistake to suppose that the menopause brings about a regression of the growth to any great extent, and he advocates their removal whenever there are symptoms, general or local. Of the total, 609 were cured; twenty-four died. Jacobs leaves a portion of the cervix in all cases where it is not involved in the growth. In 466 cases subtotal hysterectomy was performed; in the remaining eighty-nine cases it was panhysterectomy. Of the degenerations to which fibromata are subject he found calcification the most common; fatty degeneration and malignant change he finds rarer. There were three cases of suppuration and septic infection. Affections of the appendages have no direct relation to the accompanying fibromata.

Sclerotic Changes in the Uterine Blood Vessels in Cases of Hæmorrhage.

Wittek (*Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, Bd. xxiii. Heft 6) found such changes in four cases of severe menorrhagia treated by vaginal hysterectomy, other methods of treatment failing to control the hæmorrhage. Of those cases, one occurred in a nullipara, æt. 51, and three in multiparæ. In all the uteri there was no evidence of any pathological condition, except in the blood vessels. These latter changes consisted mainly of proliferation of the tunica media, with hyaline degeneration, the lumen of the vessel being occasionally found contracted. As a secondary result, the connective tissues around some of the vessels appeared to be increased, with corresponding atrophy of the muscular fibres. As a result, the arterio-sclerotic vessels would be unable to accommodate themselves to changes in blood pressure. The etiology of the condition is obscure. In nulliparæ, frequent vasomotor disturbances, and in multiparæ frequent child bearing, may be factors of etiological importance. In all the cases hæmorrhage appeared to be made worse by ergot.

Painless Labour.

Wolff (*Arch. f. Gynäk.*, Berlin, Bd. lxxviii. S. 402) reports the case of a healthy primipara, æt. 28, in labour at the normal term of pregnancy. The head when on the perineum was extracted by forceps. The child was full time, and survived. The woman had not felt any labour pains, although the uterine contractions were evident, nor had there been any reflex action of abdominal pressure at any time during the expulsive stage.

CHOREA GRAVIDARUM.

FRENCH and Hicks (*Practitioner*, London, 1906, August) report a series of twenty-one cases of chorea gravidarum, in nineteen of which there was a history of previous chorea or rheumatism. The ages of the patients varied from 19 to 31, eighteen were primiparæ, five in their second pregnancy, four in the third, and one in the fourth and fifth. In four cases there was a distinct tendency to recurrence. They note that chorea may be absent during a first pregnancy, but occur later on. The mortality in the series was 10 per cent. A rise of temperature above 100° justifies a grave prognosis. The induction of labour is seldom indicated. The pathology is the same as that of infantile chorea.

POST-PARTUM HÆMORRHAGE.

BISHOP (*Practitioner*, London, 1906, August) believes that the only rational method to stop post-partum hæmorrhage is by direct compression of the abdominal aorta, combined with elevation of the pelvis. The aorta is best controlled by the ulnar surface of the operator's hand, while the other hand may be used to aid uterine contractions. The compressing force should be gradually removed, and the effects watched. The elevation of the pelvis should be continued for at least twelve hours, and only gradually returned to the normal level.

THERAPEUTICS.

UNDER THE CHARGE OF

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THE DISTRIBUTION OF BROMINE IN THE TISSUES.

WYSS has an interesting article upon the distribution of bromine salts in the tissues. He has carefully controlled the urinary excretion, and finds that the percentage of bromine excreted remains fairly constant, and that the total excretion depends on the amount of diuresis. There is always some retention of bromine in the system. After the administration is stopped, the quantity of bromine excreted remained fairly high for some days, and then gradually diminished, but the excretion persists over a period of weeks. Bromine circulates chiefly in the serum of the blood. Wyss suggests that the bromine molecule is not readily excreted by the kidney, which acts practically as an indifferent filter. The amount excreted depends, therefore, primarily on the amount contained in the circulating blood, and, secondly, on the quantity of urine passed. He found no material difference in the excretion of healthy people when contrasted with that of epileptics. The amount of bromine retained in the brain is not very large, and brain tissue does not seem to possess any special affinity for bromines. In the second part of the paper the antagonism between chlorine and bromine is discussed. It is commonly stated that the administration of bromine increases the excretion of chlorine. The simultaneous administration of chloride along with bromides does not increase the quantity of bromine excreted, but when bromine is given the urinary excretion of chlorine rises. The explanation he offers is this. Bromide is not readily excreted, hence it accumulates in the blood, the molecular content of the blood increases, and the tissues meet this increase by an increased excretion of chlorine, which is more easily got rid of. Consequently the bromine gradually replaces the chlorine in the tissues. He claims to have demonstrated this by a series of experiments on rabbits. If a rabbit is given sodium bromide for several days, a condition of ataxia is developed. The rabbit became incapable of making co-ordinated movements with its hind limbs, while the brain does not seem much affected. If the administration is pushed, the animal dies. Wyss does not think that this action is due to bromine. He holds that it results from the absence of chlorine, which has been displaced by the bromine. In support of this view, he refers to several experiments in which a rabbit, apparently dying, revived on receiving an injection of NaCl into one of the superficial veins. The same action followed from the use of ammonium chloride; but death was not prevented if, instead of a chloride solution, an isotonic mixture of another salt, *e.g.*, a carbonate or a sulphate, was used.—*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1906, August.

INTRAVENOUS USE OF STROPHANTHIN.

FRÄNKEL employs a solution containing 1 to 1000 of strophanthin for intravenous injection. The dose used runs from 7½ to 12 minims, representing one-half to three-quarters of a millegramme of strophanthin. The action is very rapid. Within a few minutes there is increase in the blood pressure, and in from five to ten minutes the pulse becomes slower. In cardiac cases without any œdema the general condition rapidly improves, and in the presence of œdema within two or three hours. A copious diuresis is produced. In contradistinction to other writers, Fränkel holds that strophanthin is cumulative in its action, hence the drug should not be repeated till the pulse and diuresis show that the action of the previous dose has passed off. The action of strophanthin is similar to that of the other digitalis bodies, but it acts much more rapidly and energetically, so that it can be used in cases of threatening heart failure. It is much cheaper and more readily managed than digalen, and over digitalis has the advantage that there is less danger of causing gastric disturbance.—*Verhandl. d.* 23 *Kong. f. innere Med.*, 1906.

NEW TREATMENT FOR TUMOURS.

AN entirely new suggestion for the treatment of malignant tumours has been advanced by Spiers. He considers that tumour cells call forth a reactionary hyperæmia which favours their growth, and suggests that this reflex congestion may be avoided by the use of a local anæsthetic. This theory he has tested on a large number of mice infected with cancer and sarcoma. The drugs used were nirvanin, novocain, and the hydrochloride of paramido-benzoyl-piperidylæthanol. The dose used was 7½ minims of ½ per cent. solutions, and this amount was injected every second or third day into the tumour mass. None of the drugs have an antiseptic or bactericidal action. Of the three, the least satisfactory results were obtained with nirvanin and novocain. In a number of instances, especially in the more slowly growing forms of tumour, the use of the injections resulted in the healing of the tumour. Thus out of seventy-eight cases of mouse cancer, twenty-two were cured, and in sixteen a distinct, in fourteen a slight effect was evident, while only twenty-two were not materially altered. To meet the objection that many of these mouse tumours spontaneously heal, he reinjected several of his cured cases, and was able to demonstrate that all his inoculations took, and resulted in rapid growth, which was again checked by the use of the local anæsthetics. He has tested the action in a number of cases of human cancer, but the results are not very encouraging.—*München. med. Wchnschr.*, 1906, No. 40.

LUPULIN.

LUPULIN is a drug which is very rarely used in therapeutics, and about its action we are more or less ignorant. Stern seems to use it largely in gastric and intestinal functional disturbances, and claims to have obtained good results with 5 to 10 to 15 gr. doses. He insists that the lupulin must be fresh. It deteriorates rapidly, and almost all specimens prove inert if obtained from pharmaceutical houses. The best source is to obtain it from commercial houses which import it in large quantities for the use of brewers. Lupulin gives great relief in various functional diseases of the stomach, in sensory as well as motor and secretory neurosis, and in neurasthenia gastrica. Thus he employs it in nervous anorexia, often associated with hyperæsthesia of the gastric mucosa and in gastralgia. In the latter condition, if given between the attacks, lupulin proves a very effective remedy. Where it is not advisable to give it by the mouth, lupulin can be administered in the form of suppositories. In addition to its action as a symptomatic remedy, lupulin, by stimulating the general and local circulation and improving the tone of the stomach and intestine, may alleviate or eradicate the cause of certain alimentary disorders. It is useful in all forms of gastric secretory disturbance in doses up to 15 grs., and also in atony and dilatation of the stomach it is sometimes of benefit. He recommends it also for nervous flatulence and diarrhœa of the intestines. Lupulin may be used for long periods without producing any unpleasant after-effects.—*Med. Rec.*, N.Y., 1906, September 22.

DISEASES OF THE EYE.

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The Situation of the Lesion causing Loss of the Light-Reflex of the Pupil.

The elucidation of this problem is very far yet from being complete, and indeed by some the very nature of the problem is apt to be misunderstood. Bach (Marburg), who has devoted much attention to the relations of pupil and nerve centres, suggests the following definition:—A pupil is reflexly immobile if it reacts neither directly nor indirectly to light, nor to nervous or psychical stimulation, but contracts promptly and fully upon convergence. The definition is required, for reflex immobility has only too often been confused with amaurotic and with absolute immobility. Absolute immobility may follow upon reflex immobility (or Argyll Robertson pupil, as it is more often called) in tabes, and in other abnormal nervous conditions, but it is by no means certain that these two states of the pupil are due to lesions in precisely the same situation. One theory as to the position of reflex immobility is that it is in the grey matter or corpora quadrigemina, others that is in a tract uniting the optic tract and the nuclei of the third nerve, in the roots or trunk of the third nerve, in the Edinger-Westphal nucleus, or the ciliary nerves. Several of these theories have very little basis indeed to recommend them. A point which should be borne in mind is that though miosis is most frequently found along with this alteration of pupil reaction, the two conditions are not essential to one another. When the pupil is in a state of miosis, the cause is usually to be found in the posterior columns of the cervical cord, at which part the sensory stimuli, which would dilate the pupil, are cut off; thus the pupil is and remains contracted. But such a lesion does not produce reflex immobility; this is caused by damage to a tract which extends from the corpora quadrigemina to the medulla, or possibly in some cases in which the condition has been transitory, by irritation of an inhibitory centre in that situation: such is Bach's view.—*Ophth. Klin.*, Stuttgart, 1906, Bd. x. S. 12.

Panophthalmitis caused by Bacillus Perfringens.

This strictly anaerobic organism has been found in cases of fœtid otorrhœa, gangrene of the leg, and a few other conditions, but has only twice now, so far as Darier was aware, been discovered to be the cause of trouble in the eye. His case was that of a young mechanic, æt. 20, who was struck on the eye by a morsel of steel. Next day the eye looked quite well, the wound, situated a little behind the ciliary region, was already closed, and the iris acted freely, but vision was bad. With the ophthalmoscope, however, the foreign body could be distinctly seen in the fundus, so Darier decided to attempt its removal with the large magnet on the following day. Along the track by which the piece of metal had passed through the vitreous could be seen bubbles, which were naturally taken for bubbles of air, such as may be carried in by a foreign body as it enters the eye. By the next day, however, the patient was very much worse; the eye, which had not been injected at all, was now red and chemosed, the cornea dull and hazy, the lids inflamed and swollen; the eye was as hard as a stone. On introducing a Graefe knife to enlarge the wound of entrance, Darier was astonished to find that from the incision a copious frothy fluid escaped, and in the attempt, which was quite successful, to remove the foreign particle, the whole of the vitreous humour, liquefied and full of gas, came pouring out as well, " like champagne out of a bottle." The globe was at once enucleated. Bacteriological examination of specimens from different parts of the eye showed the abundant presence of a rather large organism, squared off at the ends, lying in chains,—an organism exactly resembling that described by Chaillous as occurring in a case of which the clinical history was almost exactly the same as Darier's own, and identified by him as *Bacillus perfringens.—Clin. opht.*, Paris, tome xii.

PARALYSIS OF MOVEMENT OF THE EYES UPWARDS AND DOWNWARDS.

PARALYSIS of lateral movements of the globe is common enough; paralysis of vertical movements is very rare. The description of two cases and the discussion of the nature and position of the lesion form the subject of an interesting paper by Tödter (Hamburg). Theoretically, at all events, the lesion may be cortical, subcortical, nuclear, in the hypothetical supranuclear centre about the corpora quadrigemina, or peripheral. There must, one would suppose from analogy, be a cortical centre for this movement, yet no case is on record in which such a lesion has been verified post-mortem, and the results of experiment are not in all respects satisfactory. Hysterical paralysis has, however, been noted, though with a difference, as will be explained immediately. There are good grounds for postulating a supranuclear centre in the corpora quadrigemina, and if there were no such centre the symptom of paralysis of (say) upward movement could not be present without a damage to the two elevators of each eye,—a highly improbable occurrence; the existence of such a centre is denied, however, by some writers. In most cases which have been followed by post-mortem examination the corpora quadrigemina have been found to be involved, but not in all.

If the lesion were destructive of the centre in the corpora quadrigemina, inability to move in these senses would be absolute; when the lesion is above that, as in the case of hysterical paralysis, the loss of movement is confined to the voluntary direct motions. Thus, in hysterical paralysis, the patient is unable to move the eyes downward, but if one causes him to "fix" a stationary object, and then slowly tips up his chin, the eyes go through a reflex involuntary compensatory movement downwards, in order to retain continued fixation of the object. This is impossible in the true paralyis having its origin in the corpora quadrigemina. Tödter records two cases in which recovery took place — a very rare result. — *Klin. Monatsbl. f. Augenh.*, Stuttgart, 1906, August.

Transient Amaurosis from Lead Poisoning.

As is well known, lead is apt, if taken into the system in too great quantity or for too prolonged a period, to cause gradual blindness. But the form of defect with which one is most familiar is not that dealt with in an article by Loewe (Frankfort); he refers rather to a transient affection which comes on abruptly. The author describes the case of a man, æt. 24, who was blind when he came to Loewe's clinique, and who gave the following account of himself. He had for two and a half years been engaged at a certain kind of employment, the workers at which are very liable to suffer from lead poisoning, but by great care on his own part in observing well-recognised rules, he had escaped any indication of poisoning. For about a week before he presented himself, however, he had been out of sorts, had lost appetite, and had had severe pains both in head and body. During his time of military service, some years previously, the vision of the right eye had been known to be indifferent; indeed, he had been obliged to aim with the left, and apparently in it also sight had not been quite perfect. It was not, however, till the day before he consulted Loewe that there had been any real difficulty in vision; during that night, feeling uneasy, he had risen and struck a match, only to find that he had no perception of light. When Loewe saw him he was totally blind, but nutrition was good, though the face had a slight yellowish tinge; his teeth for the most part were carious, and on the gums was a marked grey-black line; breath was fœtid, and the abdomen uneasy on palpation, though neither retracted nor distended. He had some colic, and no appetite, great headache and giddiness, and much thirst. There had been total suppression of urine, and no action of the bowels for four days. His pupils were dilated, and if they reacted at all the movement was all but imperceptible; in the fundus no changes of any kind were visible. He was, in fact, in a decidedly dangerous condition. The treatment adopted consisted of purges, ice to the head, iodide of potassium, and the wet pack. For one more day he continued entirely blind, but on the following he was able to count fingers at one metre distance; he had passed a small amount of water, which contained albumin. After this, improvement became more rapid, and in a month his vision had risen to $\frac{6}{18}$ with the right eye, and $\frac{6}{12}$ with the left; the fields were normal, and so was colour perception. As before, the fundus was quite normal in appearance in every way. In two months all symptoms had passed off.

Loewe discusses at some length the question (among others) whether the symptoms may not have been really due to uræmia, and concludes, partly from the absence of head symptoms and convulsive seizures, that

that is not the true explanation. He considers the alarming signs shown to be the outcome of an ischæmia of the cortical centres. It is known that a condition of high arterial tension precedes the occurrence of colic, and this would tend to render more easy the development of localised ischæmia. The headache of lead poisoning is by some attributed to this cause as well. Jean Galezowski, who has written very recently on this subject also, does not agree with Loewe, but rejects the ischæmia theory on the ground of the constant absence of other permanent results of such a grave degree of cerebral anæmia as the theory would seem to imply. He attributes the amaurosis rather to an œdema of the nerve sheaths secondary to the high arterial tension,—a condition which Loewe admits to be present, but to which he attaches little importance.—*Arch. Ophth.*, N.Y., 1906, parts ii. and iii.; *Arch. gén. de méd.*, Paris, 1906, No. 26.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*November* 7, 1906.—Dr. Affleck, President, in the chair.—Dr. Allan Jamieson showed microscopic specimens of Darier's disease, and Drs. Bruce and Harvey Pirie microscopic specimens of the intermedio-lateral tract of the spinal cord.—Dr. T. W. Dewar showed a case of lupus vulgaris of thirteen years' duration healed in forty days. The treatment used was intravenous injection of ethereal solution of iodoform and a local application of hydrogen peroxide.—Dr. Allan Jamieson showed a case of Darier's disease. — Dr. Byrom Bramwell, a case of disseminated sclerosis resembling tabes.—Dr. Geo. Mackay, two cases of hereditary optic atrophy.—Dr. Edwin Bramwell, a case of juvenile general paralysis. —Mr. Alexis Thomson, a clamp devised by Dr. Roosevelt of Denver Co. for gastro-intestinal anastomoses.—Mr. Stiles—(1) A case of multiple neuro-fibromata; (2) a case after enterectomy for perforated typhoid ulcer and diffuse peritonitis; (3) a case of traumatic paralysis of the seventh and eighth cranial nerves of the left side.—Dr. Luke showed Harvey Hilliard's chloroform inhaler. — Drs. Alexander Bruce and Harvey Pirie contributed a paper, entitled "A Plea for the Study of the Intermedio-Lateral Tract of the Spinal Cord." The paper was read by Dr. Bruce, who first gave a résumé of the development of our knowledge of the anatomy of this tract. The tract lies intermediate between the anterior and posterior horns, and to the side of the grey matter of the cord. There is evidence of its being the spinal centre for the efferent fibres of the sympathetic system, for division of the sympathetic in the neck results in degeneration of the cells of this tract. The degeneration consists in the cells losing their granular appearance, and in the nucleus travelling from the centre to the periphery of the cell. This change was found in the intermedio-lateral tract of the cord from a case of acute poliomyelitis in an adult, which affected the lower part of the body, and was accompanied by loss of sweating in the lower extremities. In a case of exophthalmic goitre it was thought that, as the sympathetic is so manifestly disturbed in this disease, changes would be found in the tract, and this proved to be the case in a specimen examined by the authors quite recently; the changes found not only involved the cells, but also the blood vessels in the vicinity, which showed hyaline change and thickening of the walls, accompanied by numerous hæmorrhages. The suggestion was thrown out that possibly in other diseases, often regarded as functional, involvement of the spinal sympathetic centre was the real cause of the symptoms. The paper was illustrated by many lantern-slides, showing clearly the changes referred to.

EDINBURGH OBSTETRICAL SOCIETY.—*November* 14, 1906.—Dr. J. W. BALLANTYNE, President, in the chair.—The President delivered his inaugural address. It took the form of a forecast of the changes which would have taken place in the practice and teaching of obstetrics in 1940, the centenary of the foundation of the Society.—Dr. LAMOND LACKIE read a paper on "The Management of some Occipito-posterior Cases," which will appear in a subsequent issue of the Journal.

GLASGOW PATHOLOGICAL AND CLINICAL SOCIETY.—*Monday, November* 12, 1906.—The President, Dr. J. LINDSAY STEVEN, in the chair.—Dr. EBENEZER DUNCAN and Mr. A. ERNEST MAYLARD showed a case of abscess of the lung successfully treated by operation. The patient, a young man, æt. 27, had suffered from bronchiectasis with cavity formation in the upper part of the lower lobe of the left lung for fully five and a half years. Mr. Maylard performed a preliminary resection of the rib, secured adhesion of the parietal and visceral layers of pleura by irritation of the surfaces by scratching with the point of a needle, and the wound was kept patent for some time by packing. Exploration was at first unsuccessful in striking the cavity, but subsequent operation with large-sized trocar and cannula revealed pus, director was passed, and, after withdrawal of cannula, dressing forceps, by means of which the channel was dilated. The cavity was explored with the index finger, and found to have smooth walls. It was cleansed, treated with iodoform, and drained by drainage tube. For the first three weeks the discharge was copious, and by another three weeks the wound had closed. Examination of the patient at present time shows a disappearance of the cavity, a slight degree of retraction of that side of the chest, and the spit greatly lessened, with the absence of fœtor.—Dr. A. LOUISA M'ILROY gave a microscopical and lantern demonstration of primary carcinoma of the ovary, based on a study of fifteen cases. The conclusions derived from the cases were, that a number of apparently benign tumours showed malignant changes; they usually occurred at or near the menopause; the occurrence of pregnancy had little or no influence on their origin; both ovaries were usually affected; and the occurrence of metastasis depended on the duration of the disease and the integrity of the tumour capsule. The carcinomatous growth was best found in the thickened portions of the cyst walls and in the cortex and furrows of the solid forms, and the epithelial cells were derived from the cells lining the follicles and from the cells derived from the germ epithelium.

FORFARSHIRE MEDICAL ASSOCIATION.—*November* 8, 1906.—Mr. GREIG, Vice-President, occupied the chair.—Dr. PIRIE gave a demonstration of some recent X-ray photographs, covering a great variety of conditions.—Mr. GREIG read notes of a case of a man, æt. 49, who suffered from recurrent attacks of alopecia areata, preceded and accompanied by most marked signs of nervous disturbances. There was an extremely neurotic family and personal history, the latter extending over a period of thirty years. Several relations were confined in asylums, and others had died from cerebral conditions. He himself was a coachman, leading a healthy out-of-door, but somewhat irregular life, fairly sober; no syphilitic history. For many years he was afflicted with somnambulism, always to a greater extent when alopecia was present. The alopecia first appeared after the herpes of the head, and affected one whisker, passing to eyebrow, and then to patches on the head. The condition of the hair ran the ordinary course; local and medicinal treatment had little effect, but frequent small blood-lettings was the only treatment found to modify the general symptoms.—Dr. HALLEY then read a paper on "The Surgical Out-patient Room," beginning with a few general remarks on the necessity for such a department in connection with a hospital. The special difficulties in connection with the treatment of out-patient cases was considered, and an interesting account given of the most frequent conditions for which patients came to this department of a hospital. A general discussion of the points of interest in the paper followed.

INDEX.

PAGE

ABDOMINAL REFLEX 167
,, in Typhoid Fever . 168
Aberdeen University Quater-Centenary 294
Abortion, Return of Menstruation after 176
Actinomycosis of the Pelvic Organs 84
Adipocere, On the Early Occurrence of 374
Adrenalin in the Peritoneal Cavity 369
Allbutt, Playfair, and Eden, System of Gynæcology by Many Writers. *Review* . . . 448
"Alypin" as a Local Anæsthetic in Nose and Throat Operations . 476
Amateur Science 196
Amaurosis consequent upon Hæmorrhage . . . 287
,, Transient, from Lead-Poisoning . . . 564
Anaerobic Cultures, Simple Method of Making 469

Analytical Reports—
Alypin, 96. Xeroform; Liq. Violæ Glucosidi, 192. Hommel's Hæmatogen; "Tabloid" Laxative Fruit Pastilles; Menthol Pastilles; Tabloid Ferric Chloride and Arsenic; Oxygen Baths; Liquor Colchicinæ Salicylatis (Hopkinson); Andouard's Beef Powder, 383.

Angiokeratoma, A Contribution to the Question of 90
Anti-Meningococcic Serum, An Attempt to Obtain and Estimate the Dosage of 281
Appendicitis in Infants . . 555
Ascites and Ovarian Dermoid . 556
Ataxia in Childhood . . . 91
Atony, Etiology of Fatal Post-Partum 175
Auriculo-Ventricular Bundle, Ramifications of the . . . 548

PAGE

BABINSKI'S SIGN, Appearance of, after Scopolamine Injections . 170
Bacillus Perfringens, Panophthalmitis caused by . . . 562
Bacterial Poison, A Thermostabile 281
Bain and Edgecombe, Physiology and Therapeutics of the Harrogate Waters, Baths, and Climate. *Review* 66
Balfour of Khartoum . . . 390
Ball, J. B., Handbook of Diseases of the Nose and Pharynx. *Review* 353
Belladonna Intoxication . . 370
Berkley, C., Handbook for Midwives and Maternity Nurses. *Review* 256
Bidwell, L. A., Handbook of Intestinal Surgery. *Review* . . 255
Bier's Passive Congestion Method 554
,, in Affections of the Upper Air Passages . . 183
Blastomycosis of the Skin in Man, by A. PRIMROSE 215
,, Systemic . . 72
Box, C. R., and W. M. Eccles, Clinical Applied Anatomy, or the Anatomy of Medicine and Surgery. *Review* . . . 65
Broadbent, Sir W. H. and J. F. H., Heart Disease and Aneurysm of the Aorta. *Review* . . 157
Bromide Eruptions, Pathogeny of 88
Bromine Salts, Distribution of, in the Tissues 559
Broncho-Pneumonia, Primary, in Adults, by H. G. MELVILLE . 497
Brouardel and Gilbert, Maladies Common to Animals and Man. *Review* 261
Bruce, L. C., Studies in Clinical Psychiatry. *Review* . . 347
Bryant, J. D., and A. H. Buck, American Practice of Surgery. *Review* 445

PAGE
Buchanan, George 97
Bullous Affections and their Classification 377

Cabot, R. C., Modern Clinical Medicine: Diseases of Metabolism and of the Blood, Animal Parasites, Toxicology. *Review* 538
Cæsarean Operation, Rupture of the Uterine Cicatrix after 81
,, Section in the Death Agony 80
,, ,, in Death from Cardiac Disease 80
,, ,, Post-Mortem 276
Caille, A., Differential Diagnosis and Treatment of Disease. *Review* 163
Calder, A. B., Lectures on Midwifery for Midwives. *Review* 256
Cancer, The Action of X-Rays on Inoperable 275
,, Radical Operation for 176
,, of the Rectum 366
Carcinoma, Results of Vaginal Extirpation of the Uterus for 275
Carotid Gland, Tumours of the 459
Carpal Semilunar Bone, Dislocation of the 174
Cerebral Decompression 553
Cerebro-Spinal Meningitis, Epidemic, Bacteriological Findings in Fifteen Cases of 279
Cervix Uteri, Abdominal Hysterectomy for Cancer of the 462
Chiene, G. L., Notes on a Case of Strangulated Hernia in which Two Loops of Small Intestine were involved 252
Children, The Feeding of Young, by W. A. Potts 333
Chloroform, Medical Responsibility in Cases of Death during Administration of 372
Chorea Gravidarum 462, 559
Clavin 371
Clinical Therapeutics, Introductory Lecture delivered at the Inauguration of the Chair of, Faculty of Medicine, Paris, by Albert Robin 46
Clouston, T. S., The Hygiene of Mind. *Review* 537
Colitis, Muco-Membranous, and Appendicitis 267
Colles's Law, A Contradiction (?) to 279
Croom, D. H., The Therapeutic Value of Formic Acid in Diphtheria 337
Croom, Sir Halliday, The Times of Harvey 9
Curettage, Unreliability of, for Retained Placenta after Abortion 369

PAGE
Cystitis, Catheter, Prevention of 274

Deaver, J. B., Appendicitis. *Review* 354
,, Enlargement of the Prostate. *Review* 254
Dechlorination and the Relation of Chloride Retention to Dropsy and Uræmia 455
,, and Salt-Eating 193
Decidua Reflexa, Is there a? by James Oliver 135
Délepine, A., Archives of the Public Health Laboratory of the University of Manchester. *Review* 352
Dementia Præcox 472
De Meric, H., Some Points in the Internal Treatment of Gonorrhœa 530
Depression, Effects of Exercise in Conditions of 182
Dermatitis, Exfoliative, in the New-Born Infant 463
Dermoid, Ovarian 556
Dickinson-Leigh, J., A Medico-Legal Case 253
Diphtheria, Persistence of Bacilli of, in the Throats of Convalescent Patents, by J. H. Meikle 510
Disintegration of the Personality 98
Dropsy and Uræmia, Dechlorination and the Relation of Chloride Retention to 455
Duckworth, Sir Dyce, The Dignity of Medicine 485
Dudgeon, L. S., and P. W. G. Sargent, Bacteriology of Peritonitis. *Review* 161
Dysenteric Bacilli, Relation of, to Potable Waters 477

Eclampsia, Use of Scopolamine in 175
Eczema and Psoriasis, X-Rays in 179
Edinburgh Post-Graduate Course 296
Emphysema, Subcutaneous, during Labour 557
Enteric Fever, Antisepsis and Asepsis in the Treatment of, by C. B. Ker 29
Epilepsy, Excision of Cervical Sympathetic for 471
,, Myopathy in 470
Ergot, Value of, in Obstetrics 81
Ewart, W., An Introduction to the Clinical Study of Vascular Disease 199
Exophthalmic Goitre, Dietetic Treatment of 177

PAGE

Extra-Uterine Gestation, Röntgen Rays in . . . 81
Eyes, Paralysis of Movement of the 563

FENWICK, W. SOLTAU, Displacements of the Stomach, and their Effects upon Digestion . . 395
Fibroid Tumour in Broad Ligament, Absorption of, during Pregnancy . . . 557
Fibroids, Malignant Degeneration of . . . 79
Fibroma, Hysterectomy for . 80
  ,, Molluscum . . . 378
  ,, Uteri, Observations on . 558
Filatow-Duke's or "Fourth" Disease . . . 93
FLEMING, R. A., Personal Experience of Poisoning by Charcoal Fumes . 248
  ,, Short Practice of Medicine. *Review* . . 447
Food Standards . . . 190
Formic Acid . . . 179
  ,, Therapeutic Value of, in Diphtheria, by D. H. CROOM . . . 337
"Foul Shave," A . . . 482
  ,, ,, Suggestions for Prevention . . 483
"Fourth" or Filatow-Duke's Disease . . . 93
FOWLER, J. S., Case of Infantile Myxœdema: Anomalous Result of Treatment . . . 432
Frühwald, F., Reference Handbook of the Diseases of Children. *Review* . . . 349

GALL-BLADDER and Bile Passages, Mortality in Operations on the . 364
Gastric and Duodenal Ulcer, Observations on Perforated, based on a Personal Experience of Forty-six Cases operated upon, by A. MILES . . . 106, 223
Gastric Fistula . . . 273
Gautier, A., Diets and Dietetics. *Review* . . . 258
Gelatin Injections in Kidney Disease . . . 371
General Paralysis, Pupillary Reflexes in . . . 181
Goitre, Operative Treatment of . 393
Gonorrhœa, Some Points in the Internal Treatment of, by H. DE MERIC . . . 530
Goodsall, D. H., and W. E. Miles, Diseases of the Anus and Rectum. *Review* . . . 159

HÆMATOMA of the Ovary . . 176
Hæmorrhage, Post-Partum . . 559
HALDANE, P. S., A Special Consideration of the so-called "Pancreatic Reaction" . . . 418
Hare, Caspari, and Rusby, The National Standard Dispensatory. *Review* . . . 257
Harvard Medical School, The New . . . 291
Harvey, The Times of, by Sir HALLIDAY CROOM . . . 9
Headache of Nasal Origin . . 186
Heart Beat, The Nature of . . 282
Heart Block . . . 548
  ,, Electro-motive Changes in . . . 551
  ,, Physiology of . . 550
  ,, Sudden Artificial . 550
Hebotomy . . . 556
  ,, An Experience of Twenty-one Cases of . . . 370
Hereditary Transmission of Disease and Temperament . . 7
Hernia, Appendicular Femoral . 78
  ,, Notes on a Case of Strangulated, in which Two Loops of Small Intestine were involved, by G. L. CHIENE . . . 252
HERRINGHAM, W. P., On the Prognosis of Chronic Nephritis in the Young . . . 24
Hewlett, R. T., Pathology: General and Special. *Review* . . 166
Holland, J. W., Text-Book of Medical Chemistry and Toxicology. *Review* . . . 256
Human Remains, Mistaken Diagnosis of . . . 375
Humerus, The Use of the Double-Wedge Splint in Treatment of Fractures of the, by G. WILKINSON . . . 148
Hysterectomy for Fibroma, Removal of the Ovaries in . . 80

INFIRMARY Residents, Women as 101
Inflammatory Affections, Acute, Treatment by Bier's Passive Congestion Method . . . 554
Insane, Family Care of the . . 182
Insanity in Scotland in 1904 3, 481
  ,, Tyranny and . . 101
Intracranial Hæmorrhage, Spontaneous, associated with Trigeminal Nævi . . . 554
Iron, Subcutaneous Use of . . 84

JOHNSTONE, Dr. MACKENZIE, Retirement of . . . 102
JOHNSTONE, R. W., Pentosuria, Chronic and Alimentary . . 138

PAGE

Kelly, A. O. J., International Clinics. *Review* 158
Ker, Claude B., Antisepsis and Asepsis in the Treatment of Enteric Fever 29
Kidney, Action of Gelatin Injections in Inflammatory Conditions of . . . 371
,, Determination of the Functional Capacity of the 78
Krehl, L., The Principles of Clinical Pathology. *Review* . 351

Labour, Painless 558
Lack, H. Lambert, Diseases of the Nose and its Accessory Sinuses. *Review* 451
Lead Poisoning, Transient Amaurosis from 564
Lectures, Joint Courses of . . 388
Leprosy, Pathology and Treatment of 375
Leukæmia, Metabolism in, during Treatment with X-Rays 178
,, X-Rays in . . . 82
Liquor Amnii, Disappearance of the 276
Littlejohn, Sir Henry, Presentation Portrait to 102
Lockwood, C. B., Appendicitis. *Review* 355
Lumbar Puncture 379
Lung, Infections of the, simulating Tuberculosis 72
Lupulin 561

MacGregor, J. M., Contribution to the Pathology of the Endometrium. *Review* . . . 68
M'Kendrick, Professor, Retirement of 7
Malta Fever, Etiology of . . . 5
Marshall, C. R., Text-Book of Materia Medica for Students of Medicine. *Review* 258
Maxillary Antrum, Three Cases of Acute Suppuration in the, treated by Washing through the Nasal Cavity, by A. Logan Turner 152
Maylard, A. E., Abdominal Pain: its Causes and Clinical Significance. *Review* 160
Medicine, The Dignity of, by Sir Dyce Duckworth 485
Medico-Legal Case, A, by J. Dickinson-Leigh 253
Meikle, J. H., Persistence of Bacilli in the Throats of Convalescent Diphtheria Patients: A Clinical and Bacteriological Study of Three Hundred Cases 510
Melville, H. G., Ovary Free in the Pelvic Cavity . . . 250
,, Primary Broncho-Pneumonia in Adults . . 497
Meningitis, Tuberculous . . . 467
Menstrual Fever and Menstrual Sepsis 557
Menstruation, Return of, after Abortion 176
Mental Clinics in Germany . . 473
Mercier, C., Criminal Responsibility. *Review* 164
Miles, A., Observations on Perforated Gastric and Duodenal Ulcer, based on a Personal Experience of Forty-six Cases operated upon . . . 106, 223
Milk, The, of Tuberculous Cows . 187
Moor, C. G., and R. T. Hewlett, Applied Bacteriology. *Review* 350
Morat, J. P., Physiology of the Nervous System. *Review* . 67
Mydriasis, Unilateral, in Phthisis 286
Myelogenous Polycythæmia . . 363
Myxœdema, Case of Infantile: Anomalous Result of Treatment, by J. S. Fowler 432

Nephritis, Chronic, On the Prognosis of, in the Young, by W. P. Herringham . . 24
Neuritis, Alcoholic, Mental Disturbances of 473
Nicholson, H. O., Some of the Physiological Changes in the Maternal Organism during Pregnancy, and their Significance . 123
Non-Magnetic Steel 286
Noorden, C. von, Diabetes Mellitus. *Review* 355
Nose and Throat Operations, "Alypin" as a Local Anæsthetic in . . 476
,, Treatment of Some Affections of, by Radium 474
Notes on Books, 69, 263, 357, 452, 543

Ochronosis 74
Oliver, James, Is there a Decidua Reflexa? 135
Osteomalacia cured by X-Rays . 369
Otitis Media, Treatment of, by Bier's Congestion Method . 476
Ovarian Grafting, Heteroplastic . 368
Ovaries, Effect of Röntgen Rays on, in Pregnancy . . . 368
Ovary Free in the Pelvic Cavity, by H. G. Melville . 250
,, Hæmatoma of the . . 176

"Pancreatic Reaction," A Special Consideration of the so-called, by P. S. Haldane . 418

PAGE
Panophthalmitis caused by *Bacillus perfringens* 562
Parker, C. A., Guide to Diseases of the Nose and Throat and their Treatment. *Review* . 450
Pavy, F. W., On Carbohydrate Metabolism. *Review* . . 349
Pelvic Displacement and Pain . 463
,, Organs, Actinomycosis of the 84
Pentosuria, Chronic and Alimentary, by R. W. JOHNSTONE . 138
Peripheral Nerves, Some Points in the Surgery of the, by J. SHERREN 297
Pityriasis Rosea 90
Placenta, Tuberculosis of the, and the Pregnant Uterus . . . 276
Plantar Reflex in Children . . 169
,, Response, Extensor, New Method of Eliciting . 169
Pleural Effusions, Percussion Outline of 73
Pneumococcus, Method of Isolating the, in Mixed Cultures such as Throat Cultures . . 278
Pneumonia, Knee-jerk in . . 73
Poehl, A. von, Rational Organotherapy with reference to Urosemiology. *Review* . . 352
Poisoning by Charcoal Fumes, Personal Experience of, by R. A. FLEMING 248
Polycythæmia Vera . . . 360
Potable Waters, Relation of Dysenteric Bacilli to . . . 477
POTTS, W. A., The Feeding of Young Children . . . 333
Prefrontal Lobe, Psychic Functions of the 180
Pregnancy, Intra-uterine and Abdominal . . . 275
,, Pyelonephritis complicating . . . 464
,, Some of the Physiological Changes in the Maternal Organism during, and their Significance, by H. O. NICHOLSON . . 123
,, and the Puerperal Period, Mental Disorders of, by N. RAW . . 118
,, A Rare Type of the Toxæmia of . . . 464
,, Typhoid Fever during . 463
PRIMROSE, A., Blastomycosis of the Skin in Man . . . 215
Psoriasis and Eczema, X-Rays in . 179
Puerperal Morbidity, Influence of Vaginal Douches on . . . 556
Puerperium, Significance of High Temperature with Slow Pulse in the 176

PAGE
Pulmonary Anthracosis, Intestinal Origin of . . 86
,, Streptothricosis . . 72
Pupil, Light-Reflex of, Lesion causing Loss of . . . 562
Pylorus, Hypertrophic Stenosis of the, in Infants 367

RAW, NATHAN, Mental Disorders of Pregnancy and the Puerperal Period 118

Recent Advances in Medical Science—
Dermatology, by W. ALLAN JAMIESON . . . 88, 375
Diseases of Children, by G. H. MELVILLE DUNLOP . 91, 379
Diseases of the Ear, Nose, and Throat, by P. M'BRIDE and A. LOGAN TURNER . 183, 474
Diseases of the Eye, by GEORGE A. BERRY and W. G. SYM 285, 562
Insanity, by Sir JOHN BATTY TUKE and JAMES MIDDLEMASS 180, 470
Medical Jurisprudence, by HARVEY LITTLEJOHN . . . 372
Medicine, by J. S. FOWLER 72, 167, 267, 360, 455, 548
Obstetrics and Gynæcology, by F. W. N. HAULTAIN and J. A. C. KYNOCH . 79, 174, 274, 368, 462, 556
Pathology and Bacteriology, by R. F. C. LEITH . 84, 278, 467
Physiology, by T. H. MILROY . 282
Public Health, by J. BUCHANAN YOUNG 187, 477
Surgery, by ALEXANDER MILES 76, 171, 271, 364, 459, 552
Therapeutics, by RALPH STOCKMAN and FRANCIS J. CHARTERIS . . 82, 177, 276, 370, 465, 559
Rectum, Cancer of the . . . 366
Reflexes associated with the Fifth Nerve 170
,, Recent Work on the Superficial 167

Reports of the Medical Societies—
Edinburgh Medico-Chirurgical Society . . . 95, 191, 566
Edinburgh Obstetrical Society . 96, 191, 567
Forfarshire Medical Association 567
Glasgow Pathological and Clinical Society . . . 479, 567
Respiratory System, Diseases of the 72
Retina, Spasm of the Arteries of the 285

PAGE
Rheumatism, Acute Articular, Value of Massive Doses of Salicylates in the Diagnosis and Treatment of 466
Robin, Albert, Introductory Lecture delivered at the Inauguration of the Chair of Clinical Therapeutics, Faculty of Medicine, Paris 46
Roughead, W., Notable Scottish Trials: "Dr. Pritchard." *Review* 69
Russell of Glasgow . . . 1

Sahli, H., Treatise on Diagnostic Methods. *Review* . . . 159
Sajodin 83
Salicyluric Acid in the Human Body, Formation and Action of, by R. Stockman . . . 103
Sanatoria for Working Men . . 195
Scoliosis, Treatment of, by Dr. Klapp's System of Exercises, by C. Woodward 59
Scopolamine in Eclampsia . . 175
Scottish Asylums, The Cost of . 385
Sherren, J., Some Points in the Surgery of the Peripheral Nerves 297
Shoulder, Stiff and Painful . . 271
Simpson, Sir A. R., Knighthood of 102
Sleeping Sickness, The Lymphatic Glands as a means of Diagnosis in 280
Socialistic Legislation . . . 289
Sodium Salicylate, The Value of, in Scarlatinal Arthritis and other Joint Infections, by R. Stockman 244
Spinal Anæsthesia, its Advantages and Disadvantages, by J. W. Struthers 439
,, in Medical Practice . 83
Spirochæte Pallida, Does the Blood of Syphilitic Patients contain the, and is it Contagious? . 279
Steell, Graham, Text-Book on Diseases of the Heart. *Review* . 542
Stockman, R., The Formation and Action of Salicyluric Acid in the Human Body . . . 103
,, The Value of Sodium Salicylate in Scarlatinal Arthritis and other Joint Infections . . . 244
Stomach, Displacements of the, and their Effects upon Digestion, by W. Soltau Fenwick . . . 395
Strophanthin, Intravenous Use of 560
Struthers, J. W., Spinal Anæsthesia, its Advantages and Disadvantages 439

PAGE
Subclavian Aneurysm, Surgical Treatment of 273
Surgery, The Teaching of . . 389
Syphilis, Over-Treatment of . . 465
,, Prophylactic Treatment of 278
,, Transmission of, to Monkeys 87
Syringomyelia, A Study of Two Cases of 467

Temperature, Premenstrual Elevations of 174
Tetanus after Abortion . . 275
,, Post-Operative . . 275
,, Treatment of, by Intraspinal Injection of Magnesium Sulphate . . 276
Tetany 381
Thiosinamine in the Treatment of Tinnitus Aurium and Deafness 184
Thresh and Porter, Preservatives in Food and Food Examination. *Review* 261
Thymus Stenosis of the Air Passages and Thymus Death . . 460
Thyroid Gland, Affections of the . . . 171
,, Malignant Disease of the . . 274
Tinnitus Aurium and Deafness, Thiosinamine in the Treatment of 184
Tomes, Sir J.., System of Dental Surgery. *Review* . . . 540
Toronto Meeting of the British Medical Association . . . 293
Transvaal, Tuberculosis in the . 189
Trypanosomiasis, Human (Sleeping Sickness), The Lymphatic Glands as a means of Diagnosis in 280
Tubal Pregnancy, Full-term . . 80
Tuberculosis in the Transvaal . 189
Tuberculous Cows, The Milk of . 187
Tumours, New Treatment for . 561
Turner, A. Logan, Three Cases of Acute Suppuration in the Maxillary Antrum treated by Washing through the Nasal Cavity 152
Typhlo-colitis, Muco-membranous, mistaken for Appendicitis . . 173
Typhoid Fever, Bacteriology of . 188
,, and Pregnancy . 463
,, Pulmonary Complications in . 281
Tyranny and Insanity . . . 101

University Union, The . . 291
Uric Acid, Action of some Drugs upon the, of Gouty Individuals 370

PAGE

Uric Acid, Simplified Method for the Determination of the Quantity of, in the Urine . . . 470
Uterine Blood Vessels, Sclerotic Changes in, in Cases of Hæmorrhage . . 558
,, Myomata and Malignant Disease . . . 79
Uterus, False Perforations of the . 368
,, Recent Inversion of the, successfully treated by De Ribes' Bag . . 369
,, Results of Vaginal Extirpation of the, for Carcinoma 275
,, Torsion and Laceration of, by a Pedunculated Fibroid 557
,, Tuberculosis of the Pregnant, and Placenta . 276

VASCULAR DISEASE, An Introduction to the Clinical Study of, by W. EWART 199
Ventro-Fixation, Dangers of . 175
Vermiform Appendix, Tuberculosis of the 76
Vertebræ, Lower Cervical, Complete Dislocation of . . . 552

PAGE

WALLACE, J. S., Supplementary Essays on the Cause and Prevention of Dental Caries. *Review* . 260
Wellington, R. H., The King's Coroner. *Review* . . . 354
White, J. W., and E. Martin, Genito-Urinary Surgery and Venereal Diseases. *Review* . 259
WILKINSON, G., The Use of the Double-Wedge Splint in Treatment of Fractures of the Humerus 148
Wolter und Emmerich, Die Entstehungsursachen der Gelsenkirchener Typhus-Epidemie von 1901. *Review* 63
WOODWARD, C., Treatment of Scoliosis by Dr. Klapp's System of Exercises 59

X-RAYS, Action of, on Inoperable Cancer . . . 275
,, in Leukæmia . . . 82

YOUNG, A. H., Studies in Anatomy from the Anatomical Department of the University of Manchester. *Review* . . . 356

MEDICAL EDUCATION IN THE UNITED KINGDOM.

I. EDUCATION IN GENERAL.

BEFORE describing the requirements imposed upon all those who desire to obtain a degree or diploma with the right to practise medicine and surgery, a word may well be said about the important questions—Which degree or diploma to work for? and which teaching institution to attend? There are three courses open to the aspirant to medical honours. He may enter a university which affords education as well as confers degrees; he may study at certain medical schools, and take his degree at a university which does not possess a teaching staff; or he may enter for one of the licences to practise granted by certain medical bodies. A university degree has certainly greater credit associated with it, but now that a minimum course of study, lasting for at least five years, and including a large number of compulsory classes, has been made obligatory upon all graduates and licentiates alike, the difference between the instruction provided by the universities and by the different medical schools is not so great as formerly.

The usual sum for the class and degree fees spread over the five years is about £150 to £160, when necessary extras are included. The table on the following page gives approximately the minimum cost of obtaining the different degrees and diplomas.

The fees at the different London hospitals can be compounded for by one or two payments, the sum of which is less than the total if paid by annual instalments. The curriculum for the London Colleges' diplomas costs from £110 to £158, exclusive of the examination fees. Several of the London Colleges give substantial rebatements to sons of registered medical men. If the London University M.B. course is taken, the cost is somewhat greater. The degrees of the Scottish Universities cost, with the examination fees, from £115 to £145; the licence of the Scottish Colleges, from £115 to £130.

Through the munificence of Mr. Andrew Carnegie, the cost of academic training has been lessened by the payment, under certain restrictions, of the educational fees in the case of students of Scottish nationality, and also of those who have attended at any scholastic institution under the inspection of the Scotch Education Department, of whatever nationality, during at least two years after the age of 14, provided application be properly made for the same. Mr. Carnegie has given £2,000,000 as capital for a fund for this purpose, the interest to be employed as above, in the hope that only those who require help will apply, although no questions as to circumstances are asked from any claimant.

The Carnegie Trust for the Universities of Scotland is controlled by an Executive Committee, with chambers at 14 Hanover Street, Edinburgh. Forms of application, either for university or extramural students, may be obtained by writing to the Secretary at the above address.

TABLE I.—*The Approximate Cost of Curricula.*

	Diplomas.	Class Fees.	Examination Fees, etc.	Total.
1. TEACHING UNIVERSITIES.				
Edinburgh	M.B., Ch.B. . . .	£115 0	£23 2	£138 2
Glasgow	M.B., Ch.B. . . .	97 13	23 2	120 15
Aberdeen	M.B., Ch.B. . . .	90 0	23 2	113 2
Dublin	B.A., M.B., B.Ch., B.A.O.	207 12	27 0	234 12
Durham	M.B.	115 0	26 0	141 0
,, ...	M.B., B.S.. . . .	115 0	31 0	146 0
Victoria University . .	M.B., Ch.B. . . .	138 6	17 0	155 6
Birmingham . . .	M.B., Ch.B. . . .	148 19	20 0	168 19
Oxford	B.A., B.M., B.Ch. . .	165 0	30 0	£165–£220
Cambridge . . .	M.B., B.C. . . .	150 0	20 0	£150–£200
Liverpool	M.B., Ch.B. . . .	125 0	15 0	£140 0
2. NON-TEACHING UNIVERSITIES.				
London	M.B., B.S. . . .	£150 0	£17 0	£167 0
Royal, Ireland . . .	M.B., B.Ch., B.A.O. .	145 0	17 0	162 0
3. LICENSING BODIES.				
Conjoint Scottish Qualification	L.R.C.P.E., L.R.C.S.E , and L.F.P.S.Glasg.	£90 0	£30 0	£120 0
Conjoint English Qualification	L.R.C.P. Lond., and M.R.C.S. Eng.	£90-£120	42 0	£126–£156
Society of Apothecaries .	L.S.A.	£90 0	21 0	£105 0
Conjoint Irish Qualification	L.R.C.P.I., and L.R.C.S.I.	135 0	42 0	177 0
Apothecaries' Hall . .	L.A.H.	90 0	22 1	112 1

At the provincial medical schools in England the expenses for the London Colleges' diploma are about the same sum at University College, Sheffield; £123 at University College, Bristol. For the London University degree, £25 will require to be added to cover the fees for classes necessary for the Preliminary Scientific Examination.

In Ireland, the Dublin University only confers the M.B., B.Ch., B.A.O. degree on Bachelors in Arts; the cost therefore is considerably higher than elsewhere. The expense incurred while working for the Irish diplomas comes to about £140 in Dublin, but is much less than this at any of the Queen's Colleges, whether at Belfast, Cork, or Galway. The degree of the Royal University of Ireland costs £165 at the Catholic University School of Medicine in Dublin; the diploma of the conjoint colleges, £166.

The fees for lectures and examinations, therefore, vary from about £115 to £200; and, adding the cost of books, instruments, and club subscriptions for the five years, say £30, and of maintenance during thirty-nine weeks each year, £300, we get a total expense, solely connected with the curriculum, of from £445 to £530. This estimate is the utmost minimum; in most cases a sum of £1000, or over it, will be spent in the five years.

II. THE REGULATIONS OF THE GENERAL MEDICAL COUNCIL, BINDING ON ALL THOSE ENTERING UPON THE FIVE YEARS' COURSE OF MEDICAL STUDY, CONSTITUTING THE MINIMUM COURSE ALLOWED FOR GRADUATION OR LICENCE.

A. *Preliminary Examination and Registration.*

Before registration as a medical student, from which the commencement of the five years' course is calculated, the student must be sixteen years old and pass a preliminary examination in the subjects of general education, or an examination recognised by the General Medical Council as equivalent to it. (Cf. Table II., pp. iv.–vii.)

In most cases a preliminary examination certificate is only accepted by the Council as entitling to registration, provided that it certifies that all the required subjects have been passed at one and the same time.

The student now enters his name on the books of a university or college, receives a certificate to this effect, and forwards the certificate, along with that for the preliminary examination, and a form of application for registration in the books of the General Medical Council (to be obtained from the registrars of the Council), filled up according to the instructions printed on it, to the registrar of the Branch Council for the district in which his school is situated. If this is not done within *fifteen days* from the commencement of a session, the classes taken during that session will not be recognised as qualifying for graduation. (For the names and addresses of the registrars, see p. xxiii.)

B. *Professional Education.*

The student is now officially recognised as having commenced the professional study of medicine, and is required to spend at least five years over it, of which the last year must be devoted to clinical work. Before he can enter for any of the examinations, he must produce certificates, not only to show that he has attended the necessary classes, and paid the necessary fees, but that he has given satisfaction to his teachers by his conduct, and taken part in the class examinations held during the sessions. The minimum attendance on classes which constitutes an *annus medicus* is fixed at two courses of lectures during each session, or one course of lectures and hospital practice.

Graduates in Arts or Science of any university recognised by the Medical Council, who shall have spent a year in the study of physics, chemistry, and biology, and have passed an examination in these subjects for the degrees in question, shall be held to have completed the first of the five years of medical study.

TABLE II.—*List of Examining Bodies whose Examinations in General Education are recognised by the Medical Council as qualifying for Registration as Medical or Dental Student.*

Testimonials of proficiency granted by educational bodies, according to the subjoined list, will be accepted by the Council, which reserves the right to add to or take from the list.

A Degree in Arts of any university of the United Kingdom, or of the colonies, or of such other universities as may be specially recognised from time to time by the Medical Council, is considered a sufficient testimonial of proficiency.

I. UNIVERSITIES IN THE UNITED KINGDOM.

Universities of Oxford, Cambridge, and Durham :—

(1) Junior Local Examinations (certificate to include all the required subjects at one time).

(2) Senior Local Examinations (certificates to include the required subjects).

(3) Responsions (certificate to be supplemented by others showing that the required mathematical subjects have been passed). Oxford.

(4) Moderations (certificates to include the required subjects). Oxford.

(5) Final Examination for a Degree in Arts.

(6) Higher Local Examinations (certificates to include the required subjects). Cambridge.

(7) Previous Examination (certificates to include the required subjects). Cambridge.

(8) General Examination (certificates to include the required subjects). Cambridge.

(9) Examination for Certificate of Proficiency (certificate to include all the required subjects at one time). Durham.

(10) Matriculation Examination in Arts for Graduation in Medicine, Letters, Music, and Science (certificate to include the required subjects). Durham.

Universities of London, Birmingham, and Wales, and Victoria University:

(11) Matriculation Examination (certificate to include the required subjects). London.

(12) Final Examination for a Degree in Arts or Science. London, Wales, Victoria.
(13) Matriculation Examination (certificate to include all the required subjects at one time). Victoria.
(14) Entrance Examination in Arts (certificate to include all the required subjects at one time). Victoria.
(15) Matriculation Examination (certificate to include all the required subjects at one time). Birmingham, Wales. Birmingham also has 1, 2, 3, 7, *supra.*

Universities of Edinburgh, Aberdeen, Glasgow, and St. Andrews:
(16) Junior Local Examination (certificate to include all the required subjects at one time). Edinburgh and Aberdeen.
(17) Senior Local Examination (certificates to include the required subjects). Edinburgh and Aberdeen.
(18) Preliminary Examination for Graduation in Medicine and Surgery (certificate to include the required subjects).
(19) Preliminary Examination for Graduation in Arts or Science (certificate to include the required subjects).
(20) Final Examination for a Degree in Arts or Science.
(21) Final Examination for the Diploma of L.L.A. St. Andrews.

University of Dublin:
(22) Public Entrance Examination (certificate to include the required subjects).
(23) Examination for the First, Second, Third, or Fourth Year in Arts (certificate to be signed in the approved form by the medical registrar of the university).
(24) Final Examination for a Degree in Arts.

Royal University of Ireland:
(25) Matriculation Examination (certificate to include the required subjects).
(26) Final Examination for a Degree in Arts or Science.

Oxford and Cambridge Schools' Examination Board:
(27) Lower Certificate (to include all the required subjects at one time).
(28) Higher Certificate (certificates to include the required subjects).
(29) Leaving Certificate (to include the required subjects).

II. MEDICAL LICENSING BODIES.

Royal Colleges of Physicians and Surgeons in Ireland:
(30) Preliminary Examination (certificate to include all the required subjects at one time).

III. EDUCATIONAL BODIES OTHER THAN UNIVERSITIES

College of Preceptors:
(31) Examination for a First-Class Certificate or Second-Class Certificate of First or Second Division (to include all the required subjects at one time).

(32) Preliminary Examination for Medical Students (certificate to include all the required subjects at one time).

Scotch Education Department:

(33) Examination for Lower Grade Leaving Certificate (to include all the required subjects at one time).

(34) Examinations for Higher Grade or Honours Leaving Certificate (to include the required subjects).

Educational Institute of Scotland:

(35) Preliminary Medical Examination (certificate to include all the required subjects at one time).

Intermediate Educational Board of Ireland:

(36) Junior or Middle Grade Examination (certificate to include all the required subjects at one time).

(37) Senior Grade Examination (certificates to include the required subjects).

Central Welsh Board:

(38) Senior Certificate Examination.

IV. INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

Universities of Punjab and Allahabad:

(39) Intermediate Examination in Arts.

Universities of Malta; Bombay; Madras; M'Gill College and Bishop's College, Montreal; Fredericton, New Brunswick; Toronto; Trinity and Victoria, Toronto; Queen's, Kingston; Western, Ontario; Mount Allison College, New Brunswick; King's College, Nova Scotia; Dalhousie, Halifax; Melbourne; Sydney; and Cape of Good Hope; and the Colleges of Quebec; Trinity, Toronto; Ontario; and New Brunswick:

(40) Matriculation Examination.

Ceylon Medical College; Universities of Manitoba, Otago, and New Zealand; and the Medical Boards of Nova Scotia and Newfoundland:

(41) Preliminary Examination.

Universities of Madras, Calcutta, Sydney, and Adelaide:

(42) First Examination in Arts.

Universities of Sydney, Adelaide, and Tasmania:

(43) Senior Public Examination.

Codrington College, Barbadoes:

(44) Arts Examinations at Durham University.

Continental Bodies:

(45) The German Abiturienten-Examen of the Gymnasia and Realgymnasia; Examinations entitling to the French Diplomas of Bachelier ès Lettres and Bachelier ès Sciences, and other corresponding Entrance Examinations to the Universities.

Egyptian Government:
(46) Secondary Education Certificate.

(*a*) No certificate from the bodies in the foregoing section (IV.) is accepted unless it shows that the examination has been conducted by or under the authority of the body granting it, includes all the subjects required by the General Medical Council, and states that all the subjects of examination have been passed in at one time; and copies of the form of the required certificate are supplied by the registrar of the Council for the purpose.

(*b*) In the case of natives of India or other Oriental countries whose vernacular is other than English, an examination in a classic Oriental language may be accepted instead of an examination in Latin.

The Subjects in which Courses are required of all Candidates by the General Medical Council.

In every course of professional study and examinations, the following subjects must be contained:—

(1) Physics, including the elementary mechanics of solids and fluids, and the rudiments of heat, light, and electricity.
(2) Chemistry, including the principles of the science, and the details which bear on the study of medicine.
(3) Elementary biology.
(4) Anatomy.
(5) Physiology.
(6) Materia medica and pharmacy.
(7) Pathology.
(8) Therapeutics.
(9) Medicine, including medical anatomy and clinical medicine.
(10) Surgery, including surgical anatomy and clinical surgery.
(11) Midwifery, including diseases peculiar to women and to new-born children.
(12) Theory and practice of vaccination.
(13) Forensic medicine.
(14) Hygiene.
(15) Mental disease.

It is to be understood, as regards the above-mentioned subjects, that the Council offers no opinion as to the manner in which the subjects should be combined or distributed for purposes of teaching or examination.

TABLE III.—*Details of the Curriculum required by the various*

(Minimum Age in all, 21 years ;

	SUBJECTS OF COURSES REQUIRED,															
	Length of Compulsory Study at Institution giving Degree.	Chemistry.	Practical Chemistry.	Botany.	Zoology.	Physics.	Practical Physics.	Anatomy.	Practical Anatomy.	Physiology.	Practical Physiology.	Practical Histology.	Materia Medica and Therapeutics.	Practical Pharmacy.	Pathology.	Practical Pathology.	Post-mortems.
SCOTLAND.	Years.																
M.B., Ch.B. Universities of Edinburgh, Glasgow, Aberdeen, St. Andrews	2	6	3	3	3	3	..	6	12	6	3	..	6	25 mtgs. or 3 mths.	6	3	3 mths. 20 sect. 25 sect. Course
L.R.C.P. and L.R.C.S.Ed.; and L.F.P.S.Glasg.; and the Scotch Colleges . .	..	6	3	..	3	3	..	6	12	6	..	..	3	3	3	..	3
ENGLAND.																	
London University, M.B. . " " B.S. .	..	C.	C.	..	C.	C.	..	6	12	6	6	3	3	2	C.	..	C.
Durham University, M.B. . " " B.S. .	1	6	3	..	3	3	3	12	12	6	3	3	3	3	3	..	25 (sect.)
Victoria University, M.B. . " " B.S. .	2	6	3	..	4	6	3	6	15	6	C.	..	9	C.	6	C.	12
Birmingham University, M.B. " " B.Ch.	4	6	3	..	6	6	3		9	6	3	..	9	3	6	3	12 mths.
Universities of Oxford[1] M.B. Cambridge B.C.	6 3	C.	C.	C.	C.	Course		C.	6	6	..	..	C.	C.	C.	..	C.
L.R.C.P.Lond.; and M.R.C.S. Eng., London Colleges .	..	180 hrs.		..	120 hrs.	120 hrs.		6	12	C.	6		3	3	3		12
L.S.A. London, Society of Apothecaries . . .	..	6	3	..	3	..	..	6	12	6	..	3	6	3	3	..	C.
IRELAND.																	
Dublin University, B.A. M.B., B.Ch., B.A.O. . . .	4	6	3	3	3	C.	..	6	12	12	C.	3	3	..	6	3	3
Royal University, Dublin, M.B., B.Ch., B.A.O. . .	..	6	3	3	3	3		12	12	12	3	..	3	3	3	3	6 (sect.)
L.R.C.P.I. and L.R.C.S.I., Irish Colleges . . .	..	6	3	..	3	3	..	6	12	6	..	3	3	3 or 3 yrs. apprentice.	..	..	30 mtgs.)

Figures represent months unless

---

[1] The Oxford degrees are only conferred on those holding the B.A. degree of the University ; the details of the

Universities and Licensing Bodies for Degrees or Diplomas.

length of Course, 5 years.)

WITH LENGTH OF ATTENDANCE.

Medical Jurisprudence and Public Health.	Medicine.	Clinical Medicine.	Surgery.	Clinical Surgery.	Operative Surgery.	Regional Anatomy.	Midwifery and Diseases of Women.	Diseases of Women.	Labour Cases, or Practical Midwifery.	Hospital Practice.	Dispensary.	Mental Diseases.	Infectious Diseases.	Ophthalmology.	Diseases of Children, or Laryngology.	Clerk and Dresser in Hospital. Med.	Clerk and Dresser in Hospital. Surg.	Vaccination.
										Years.		Meetings.						
3	6	9	6	9	C.	..	6	..	12 cases or 3 mths. and 6 cases	3	6	16 16 C. C.	12 10 3 mths. C.	24 20 3 mths. C.	18 (optional) 3 mths.	6	6	Certificate.
3	6	0	6	9	..	..	3	..	20 cases or 3 mths. and 6 cases	2	6	13	13	13	..	Certificate.		
												Mths.	Months.	Months.				
Course.	6	24	6	24	.. C.	.. ..	C.	..	20 cases	4	6	2	2	C.	C.	Certificate.		
3 C.	12	18	12	18	.. C.	.. C.	3	..	20 "	4	..	3	20 cases	..	..	6	6	
3 3	12	24	6	24	.. 6	.. ..	6	3	20 "	2	..	C.	C.	..	..	6	6	
3 6	12	18	12	18	3	3	6	3	20 "	3	..	3	3	3	..	6	6	
C. C.	6	C.	6	C.	C.	..	C.	..	20 "	3	..	C.	3	..	..	6	6	
3 3	6	9	6	9	C.	..	3	12 mtgs.	20 "	2	6	C.	C.	3	..	6	6	
3 3	6	9	6	9	C.	..	6	..	20 "	3	..	3	3	3		6	6	
										Mths.								
3 ..	6	27	6	27	3	6	6	..	6 mths. 30 cases	27	..	3	C.	3	..	..	..	1
3 3	6	33	6	33	24 mtgs.	..	6	..	6 mths. 20 cases	33	..	3	10 cases and 3 mths.	3	..	3	3	10 mtgs.
3 ..	6	27	6	27	30 mtgs.	..	6	..	6 mths. 30 cases	27	..	3	C.	3		..	..	Certificate.

otherwise stated. C. = Course.

curriculum required differ in many respects from the others, and may be obtained from the University Authorities.

TABLE IV.—*Table of Universities, Medical Schools and Institutions, with the Dates for Preliminary Examinations and Sessions*, 1906–1907.

	PRELIMINARY OR MATRICULATION EXAMINATION.	SESSIONS.		
		Winter.	Spring.	Summer.
ENGLAND AND WALES.				
London University	Jan. June. Sept.	..	..	..
The Royal College of Physicians, London; and Surgeons, England	Oct. April. (Coll. of Preceptors.) Jan. July.	..	..	..
London Hospitals: Guy's	As in last two	Oct. 1.	..	Beginning of May.
St. Bartholomew's		" "	..	"
St. Mary's		" "	..	"
Westminster		" "	..	"
London		" "	..	"
Middlesex		" "	..	"
St. George's		" "	..	..
Charing Cross		" "	..	"
St. Thomas's		" "	..	"
King's		" "	..	..
University		" "	..	..
PROVINCIAL.				
Durham University	Sept., Jan., March.	" 1.	..	"
University of Liverpool	June and September.	" "	..	"
Victoria University, Manchester		" "	..	"
University of Birmingham	June and September.	" "	..	"
University College, Bristol		" "	..	"
University College, Sheffield		" "	..	"
University of Leeds	...	..	..	..
Universities of Wales: University College, Bangor	Local Examinations by College. of Preceptors, etc.	" 2.	..	..
" " Cardiff		" "	..	..
" " Aberystwyth	..	" "	..	..
SCOTLAND.				
Universities of: Edinburgh	Sept. 25. March.	Oct. 16.	..	May.
Glasgow		" 18.	..	April 24.
Aberdeen		" 15.	..	..
St. Andrews		" 15.	..	..
Edinburgh School of Medicine	Sept. 11. March.	" 16.	..	May.
University College, Dundee	Sept. 25. March.	" 15.	..	April 24.
St. Mungo's College, Glasgow	Sept., April, July.	" 18.	..	" "
Anderson's College, Glasgow		" 18.	..	" "
IRELAND.				
Dublin University	(B.A. Degree.)	" 1.	..	May.
Royal University of Ireland	Sept. June.	..	..	..
Conjoint Colleges	" March.	" 1.	..	April 1.
Catholic University	" "	Nov. .	..	..
Queen's Colleges: Galway	Oct., Nov. ..	Oct. 19.	..	May.
Cork	" ..	" 22.	..	"
Belfast	" .	" 16.	..	"

C. SINGLE QUALIFICATIONS NOT CONFERRING IN THEMSELVES THE RIGHT TO REGISTER.

Many of the colleges confer degrees or diplomas on members of the profession who already possess a registrable qualification. The M.B. of London and Durham Universities allows the holder to practise, while the examination for M.B. at Oxford and Cambridge is the same as that for B.C.

Owing to the limited space at our disposal, it is impossible to enter into any details as to the conditions under which these degrees and diplomas are given, especially as they appertain to graduates who hardly require information about them. All the universities confer degrees of Doctor of Medicine and Master in Surgery on their graduates, only imposing as a condition that a longer or shorter interval shall elapse between graduation and the grant of the higher degree. Generally, the candidate has to present an original essay or thesis, and in some instances to pass a clinical examination.

At Cambridge University the M.D. degree may be taken three years after M.B., B.C. two years after M.C. The London and Durham M.D. and M.S. are conferred on M.B. and B.S. graduates respectively, after two years have elapsed; the equivalent degrees of the Victoria University, after one year. At the Scotch Universities the degrees of M.D. or Ch.M. are granted after two years' practice or one year's hospital or research work, if the candidate be 24 years old. Both the Irish Universities require three years to elapse.

Royal Colleges.

The Royal College of Physicians of London grants the membership to university graduates or to its licentiates after an examination, fee £42. Recipients must have attained the age of 25 years. The Royal College of Surgeons of England grants its fellowships to persons of or above 25 years of age, who have been six years in practice, and who must pass the membership examination before the second examination for the higher degree. Fee, if a member, £15, 15s.; if not, £31, 10s. Similarly, the Scottish corporations grant single licences to persons of either sex who already hold a recognised qualification—the Royal College of Physicians, Edinburgh, to those with a surgical; the Royal College of Surgeons, Edinburgh, and the Faculty in Glasgow, to those with a medical qualification. The fee in each case is £15, 15s.

The Royal College of Physicians, Edinburgh, confers its membership on licentiates of the college, and graduates of universities of the United Kingdom, after attaining 24 years, on examination. Fee for licentiate, £15, 15s.; for others, £36, 15s. The fellowship is conferred by election on members, aged 25, of two years' standing. Fee, £64, 18s.

An examination is required of candidates for the Fellowship of the Royal College of Surgeons, who must be 25 years of age, and registered practitioners of two years' standing. Fee for licentiates, £30; for others, £45. Similar regulations apply to the Fellowship of the Faculty of Physicians and Surgeons of Glasgow, but 24 is the minimum age. The fees are different, if the candidate desires to qualify for holding office or not; £50 or £30 for non-licentiates, £15 or £25 for licentiates.

The Royal College of Physicians of Ireland grants licences in medicine and in midwifery to registered practitioners, a membership diploma to licentiates 25 years of age, of three years' standing, and to practitioners of seven years' standing or University B.A.s., after one year's possession of the licence. Fee, £21 (£15, 15s. to graduates in Arts).

The Royal College of Surgeons in Ireland retains the right of deciding whether candidates for the Fellowship shall be admitted to examination or not. Licentiates or graduates in surgery of less than ten years' standing have to pass two examinations; fees, £26, 5s. for licentiates of the college, £42 for others. When of more than two years' standing they have only one examination; fees, £26, 5s. and £42, as before.

Further information with regard to these qualifications can be obtained from the secretaries of the different colleges. A list containing their names and addresses will be found below (p. xxii.).

POST-GRADUATE COURSES.

In London, Edinburgh, Dublin, Cambridge, regular post-graduate classes are now held, although, when compared with the classes for graduates carried on in connection with many of the continental medical schools, they still leave somewhat to be desired, both in arrangement and in the zeal shown by those who might be expected to support them more warmly. At most of the infirmaries and hospitals throughout the kingdom, in which clinical teaching is recognised, graduates can attend either on the same terms as undergraduates or at special rates.

Fourteen of the London general and special hospitals have lately combined in a scheme for the better provision of post-graduate clinical teaching; a fee of £10, 10s. or of £15, 15s., enabling practitioners to attend the clinical instruction, the operations and autopsies, for three or six months respectively, at any one of these hospitals. The autumn session commenced on 1st September. Further information may be obtained from the Secretary, London Post-Graduate Association, Examination Hall, Victoria Embankment.

In May 1899, a London Medical Graduates College and Polyclinic was opened at 22 Chenies Street, Gower Street, W.C., at which consultations in various branches of medicine and surgery are held daily, except on Saturdays; clinical lectures are given, and practical classes conducted. An annual subscription of £1, 1s. admits the subscriber to the consultations and lectures. The fees for special courses vary from £1, 1s. to £5, 5s. Other institutions of a similar nature in London are the West London Post-Graduates College (Dean, Mr. L. A. Bidwell, West London Hospital, Hammersmith), which is said to be well adapted to the needs of naval and army surgeons, and the North-East London Post-Graduate College (Dean, Dr. A. J. Whiting, 142 Harley Street, W.), at which the course for the M.D. (Lond.) may be taken. Session begins October 20th.

Both in London and Liverpool Schools of Tropical Medicine have been established, at which graduates can study at first hand the diseases special to tropical countries. The London School commences the first of these annual courses on 1st October.

At Charing Cross Hospital special series of clinical lectures and practical demonstrations, exclusively arranged for the convenience of practitioners and post-graduate students, are given by members of the staff throughout the year. The lectures for the year are arranged in three courses, each consisting of ten meetings, and lasting ten weeks.

In Cambridge, graduates of other universities are admitted as advanced students. They may for one or more terms pursue courses of advanced study or research, literary or scientific, under the direction of the University teachers, and may become members of certain colleges without fulfilling the same conditions as are imposed on junior students, their collegiate status being assimilated to that of students who have taken their first degree in the university.

In Edinburgh a number of classes open to post-graduates are carried on throughout the whole year:—Ophthalmology and Ophthalmoscopy; Laryngology and Diseases of the Throat, Nose, and Ear; Dermatology; Diseases of Children; Chest Diseases; and Gynæcology. Post-graduate vacation courses have now been instituted in Edinburgh and Glasgow. In the former centre the course comprises lectures, demonstrations, laboratory instruction, and clinical work. The fee is 6 guineas, and the course lasts from Sept. 17 to Oct. 6. In Glasgow the course begins on Sept. 4, and consists of a series of 120 meetings in various departments of medicine. The Secretary of the Edinburgh course is Dr. Edwin Bramwell, 23 Drumsheugh Gardens; of the Glasgow course, Dr. Maxtone Thom, Royal Infirmary.

THE MEDICAL EDUCATION OF WOMEN.

A number of qualifications are now open to men and women alike. The degrees of the English Universities, except Oxford and Cambridge, of the Royal University of Ireland, and of the four Scotch Universities, may be conferred on women: who also may be granted the conjoint diplomas of the Scotch and Irish Boards, and the licence of the Society of Apothecaries, London.

The conditions for the qualification of women are practically the same as those for men. The University of Edinburgh, however, does not recognise attendance on mixed classes without sufficient reason shown.

The secretaries of the different schools, from whom prospectuses and any information required may be obtained, are as follows:—

London School of Medicine for Women—Miss Douie, 8 Hunter Street, Brunswick Square, W.C.

Newcastle School of Medicine (Durham University)—Secretary, Durham University.

Medical College for Women, Minto House, Edinburgh — The Secretary.

Queen Margaret's College, Glasgow—Miss Galloway.

Royal College of Surgeons, Ireland (rooms in connection with the college are set apart for the use of female students)—I. F. Blake, Registrar.

The tables given below show the different degrees and diplomas open to women, the recognised schools, and the approximate cost of the class and college fees.

TABLE V.—*Degrees and Diplomas open to Women.*

University Degrees.	Diplomas.
London. Durham. Birmingham. Sheffield. University College of S. Wales. The Royal, Ireland. The Four Scotch Universities.	1. *Conferring Qualification to Practise.* The Triple Qualification of the Royal Colleges, Scotland. The Conjoint Qualification of the Royal Colleges, Ireland. The Society of Apothecaries, London. 2. *Not conferring Qualification.* Licence of the Royal College of Surgeons, Edinburgh.

With the exception of two of the Scottish Universities, all these qualifications are given on the same conditions as to men. At Edinburgh and Glasgow Universities the compulsory two years' residence is allowed to be represented by residence at a recognised School for the Medical Teaching of Women.

TABLE VI.—*Medical Schools for Women.*

Name.	Cost of Curriculum and Fees.
London School of Medicine for Women, Brunswick Square	£125
College of Medicine, Newcastle-on-Tyne .	£146
Scottish Association, Edinburgh (qualifies for Edinburgh University)	(University), £128, 7s. (Colleges), £130
Queen Margaret College, Glasgow (qualifies for Glasgow University)	£129
Schools of Surgery of the Royal College of Surgeons, Ireland	(For College Degree), £165–£172.
Aberdeen and St. Andrews Universities (only first two years at St. Andrews).	
Dundee University College.	
Queen's College, Galway.	

PUBLIC HEALTH.

The Local Government Act, passed in 1888, provides that all medical officers of health of counties or districts with a population of 50,000 or more, must possess a diploma in public health, or must have been a medical officer of a district with 20,000 inhabitants for three consecutive years before 1892; or, before the passing of the aforesaid Act, have been for not less than three years a medical officer or inspector under the Local Government Board.

Qualifications in public health (sanitary science, sanitary medicine, State medicine) are therefore much more sought after than formerly. They do not carry a right to register, and are only conferred on candidates already possessed of a registrable qualification.

Certain regulations for candidates for diplomas in public health, designed to ensure "the possession of a distinctly high proficiency, scientific and practical, in all the branches of study which concern the public health," have been laid down by the General Medical Council. The Council now recommends the following rules to be observed:—

Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended, during six months, practical instruction in a laboratory.

1. A period of not less than twelve months shall elapse between the attainment of a registrable qualification in medicine, surgery, and midwifery, and the admission of the candidate to any examination or any part thereof for a diploma in sanitary science, public health, or State medicine.

2. Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended during six months, practical instruction in a laboratory or laboratories, British or foreign, approved of by the body granting the diploma, in which chemistry, bacteriology, and the pathology of the diseases of animals transmissible to man are taught.

3. Every candidate shall produce evidence that, during a period of six months after obtaining a registrable qualification, he has practically studied the duties of outdoor sanitary work—(*a*) In England and Wales, either under the medical officer of health of a county, or of a single sanitary district having, at the date of the last census, a population of not less than 50,000, or a medical officer of health, devoting his whole time to public health work; or (*b*) in Scotland or Ireland, under the medical officer of health of a county, or of one or more sanitary districts having at the date of the last census a population of not less than 30,000; or (*c*) under a medical officer of health who is also a teacher in the department of public health of a recognised medical school. The six months may be reduced to three, if a three months recognised course of Sanitary Law and Engineering Vital Statistics, etc., has been attended.

⁂ Any candidate who shall produce evidence that he has himself held an appointment of medical officer of health, under conditions not requiring the possession of a special sanitary diploma, shall be exempt from this regulation.

4. Every candidate shall produce evidence that he has attended the clinical practice for three months of a hospital for infectious

diseases, at which opportunities are afforded for the study of methods of administration.

5. The examination shall be conducted by Examiners specially qualified, and shall include laboratory work.

⁂ The rules as to study shall not apply to medical practitioners registered, or entitled to be registered, on or before 1st January 1890.

Degrees and Diplomas.

DEGREES (FOR UNIVERSITY GRADUATES IN MEDICINE).

M.D. (State Medicine), London. (Two years' study required.)

B.Hy., Durham. (Three months' course in comparative pathology (lectures), etc.; must study at Newcastle School of Medicine.)

B.Sc., Birmingham. (Six months' laboratory course of hygienic chemistry; a course of bacteriology; six months' practical outdoor experience; attendance upon a fever hospital.)

B.Sc., Edinburgh. (Eight months' laboratory (five at Edinburgh University) courses in physics, geology, public health, sanitary engineering, and in mensuration and drawing required, as well as official regulations.)

D.Hy., Durham. (Earliest date, two years after B.Hy., spent as M.O.H. Essay sent in.)

D.Sc., Edinburgh. (Five years after B.Sc., Thesis and Examination.)

B.Sc., Victoria University, Manchester (three years' study required).

DIPLOMAS.

D.P.H.
- Durham University. (Regulations as for B.Hy., but need not be a University graduate, nor have studied at Newcastle.)
- Oxford University. (Must fulfil General Medical Council's conditions.)
- Cambridge University. (Do.)
- Victoria University. (As at Oxford.)
- Aberdeen University. (Fever hospital course, six months; if not M.B.Aberd., must attend some of the necessary classes.)
- Birmingham University. (As at Oxford.)
- Leeds University. (As at Oxford.)
- Royal Colleges, London. (As at Cambridge.)
- Royal Colleges, Edinburgh and Glasgow. (As at Oxford.)

D.S.M., Dublin University. (Must be a graduate of the Universities of Dublin, Oxford, or Cambridge, or M.D.)

,, Royal Colleges, Ireland. (As at Oxford.)

D.S.Sc., Royal University, Ireland. (Only conferred on graduates of the University. Cf. Calendar.)

Medical practitioners who registered or were entitled to register before 1st January 1890 are admitted to the examination for the Durham D.P.H., under the same conditions as are noted above. Twenty-eight days' notice is required. Fee, £10, 10s. At Oxford and Cambridge Universities the diplomas in public health are granted to any registered person who, if he qualified before 1st January 1890, is not required to pursue a prescribed course of study. Similar regulations govern the examinations of the different colleges in the case of those who qualified prior to 1890.

The actual scope of the examinations as held at the different centres can be easily ascertained from the syllabuses and calendars to be obtained from the secretaries. The titles of the books best adapted for perusal in view of the examinations may be seen in the *British Medical Journal* for September 3, 1904.

Fees for examinations.—D.P.H.—£10, 10s., English, Scottish, and Irish Colleges; Durham, St. Andrews, and Victoria Universities: £5, London and Royal Irish Universities: £5, 5s., Aberdeen: £10, Oxford: £12, 12s., Cambridge.

B.Sc.—£6, 6s., Edinburgh; £10, Birmingham.

B.Hy.—£16, 16s., Durham.

Usual fee for six months' laboratory work, £10, 10s. to £21.

Institutions at which Laboratory Work and Classes for Public Health Curriculum can be taken.

LONDON.

St. Bartholomew's Hospital.—Inclusive fee, 20 guineas.

Charing Cross Hospital.—Inclusive fee, 20 guineas.

St. George's Hospital.—Inclusive fee, 20 guineas; for candidates registered before 1st January 1890, 12 guineas.

Guy's Hospital.—Inclusive fee for six months' course of laboratory instruction and lectures, 20 guineas.

King's College.—Fee includes all course necessary.

London Hospital.—Inclusive fee, 20 guineas; three months' course, 12 guineas.

St. Mary's Hospital.—Six months' course, inclusive fee, 12 guineas.

St. Thomas's Hospital.—Inclusive fee, 20 guineas; short course, 6 guineas

University College.

Middlesex Hospital.

PROVINCIAL.

Cambridge University.

Birmingham University.—Inclusive fee, 13 guineas.

University of Liverpool.

University of Leeds.

University of Durham, College of Medicine, Newcastle-on-Tyne.

University College, Bristol.

Victoria University, Manchester.

IRELAND.

School of Physic, Dublin.

The Catholic University School of Medicine.

Royal College of Surgeons, Schools of Surgery, Dublin.

SCOTLAND.

University of Edinburgh.—Fees, winter session, 10 guineas; summer session, 6 guineas.

University of Glasgow.—Fee for course of instruction, 10 guineas.

University of Aberdeen.—Fee for course of instruction, 9 guineas.

St. Mungo's College, Glasgow.—Fees: winter session of lectures and six months' laboratory instruction, 12 guineas; summer session of lectures and three months' laboratory instruction, 6 guineas.

The Conjoint Board in Scotland.—Fee for six months' laboratory course, 18 guineas.

CLINICAL HOSPITALS.

There are a number of hospitals throughout the kingdom which may be attended for the purpose of clinical study, especially during the fifth year of the curriculum, and attendance at which is accepted by many of the licensing boards as part of the compulsory period for hospital work.

In *London*, in addition to the clinical hospitals attached to the medical schools, the conjoint board of the Royal Colleges of Physicians and Surgeons accept certificates of attendance during the fifth year of study, from the—Great Northern Central Hospital, 155 beds; West London Hospital, 175 beds, Fee, 5 guineas; The Hospital for Sick Children, Great Ormond Street, 186 beds, Fee, 3 guineas; East London Hospital for Children, 100 beds, Fee, 4 guineas; Royal London Ophthalmic Hospital, 100 beds, Fee, 5 guineas; Hospital for Consumption, Brompton, 321 beds, Fee, 8 guineas; City of London Hospital for Diseases of the Chest, 164 beds; National Hospital for the Paralysed, etc., Queen Square, 200 beds; Queen Charlotte's Lying-in Hospital, 1100 patients annually, Fee, 8 guineas for four weeks.

Fever hospitals and asylums.—The Metropolitan Fever Hospitals, Fee, £3. 3s., two months, £1, 1s. each additional month; Bethlem Royal Hospital, Lower Hall Asylum, Bow; Camberwell House Asylum. Bethnal.

THE PROVINCES.

Liverpool—Royal Southern, 200 beds, Fee, £26, 5s.[1]; Northern, 155 beds, Fee, £26, 5s.[1]; Eye and Ear Infirmary, Myrtle Street, 46 beds; Infirmary for Children, 88 beds, free.

Manchester—St. Mary's Hospital for Diseases of Women and Children, 55 beds, 3400 labours, Fee for necessary course, £2, 2s.

Newcastle-on-Tyne—Hospital for Sick Children, 60 beds, free.

Bath—Royal United Hospital, 130 beds.

Birmingham—Midland Hospital for Skin and Urinary Diseases, £5, 5s. for three months.

Bradford—Royal Infirmary, 230 beds, £10, 10s.[1]

Brighton—Sussex County Hospital, 190 beds, £21 for two years.

Derby—Derbyshire Royal Infirmary, 198 beds, £10, 10s. annually.

Devonport—Royal Albert Hospital, 88 beds, £2, 2s.

Hospitals in *Exeter*, *Gloucester*, £20 a year; *Lincoln*, £10, 10s.; *Norwich*, £15, 15s.; *Nottingham*, £10, 10s.; *Staffordshire*, £10, 10s.; *Winchester*, £21[1]; *Wolverhampton*, £21.[1]

SCOTLAND.

Edinburgh—Royal Infirmary, 790 beds, £12[1]; Victoria Hospital for Consumption, 15 beds, £2, 2s. for course; Royal Hospital for Sick Children, 119 beds, £2, 2s. for course; Eye, Ear, and Throat Infirmary, 6 beds, £1, 1s.; Royal Maternity, 40 beds, £2, 2s.; City Hospital for Infectious Diseases, 400 beds, £2, 2s.; Royal Asylum, Morningside, 700 beds, £2, 2s.

Glasgow—Royal Hospital for Sick Children, 80 beds, £1, 1s.; Western Infirmary; 400 beds, £21[1]; Eye Infirmary, £1, 1s.; Royal Infirmary, £21[1]; Maternity; Belvedere Fever Hospital; Lock Hospital.

Dundee—Royal Infirmary, 286 beds; Royal Asylum.

Aberdeen—Royal Infirmary, Fee, £6; Sick Children's Hospital.

IRELAND.

Dublin—Sir Patrick Dun's Hospital, £12, 12s.[1]; Richmond, Whitworth, and Hardwicke Hospitals,[2] 312 beds; Richmond Asylum, 1200 beds; Adelaide Hospitals, 140 beds; City of Dublin Hospital; Jervis Street Hospital, £12, 12s. a year; Mater Misericordiæ Hospital,[2] 323 beds; Dr. Steeven's Hospital,[2] 200 beds, £10, 10s., three months; St. Vincent's Hospital, 160 beds; Meath Hospital,[2] 160 beds; Rotunda Hospital, 1700 labours intern, 1800 extern annually—Fee, for term, six months, £21, three months, £12, 12s., Extras, £10, 10s. and £6, 6s., Cork Street Fever Hospital; Coombe Lying-in Hospital.

Belfast—The Royal, £20[1]; Maternity; Ophthalmic; Eye, Ear, and Throat Hospitals; and those for Diseases of Women, for Sick Children, and the District Asylum.

Cork—North (100 beds) and South (100 beds) Infirmaries; the Mercy, Cork Union, Lying-in, Maternity, Fever, Gynecological, and Ophthalmic and Aural Hospitals; and the Eglinton Asylum.

Galway—County Infirmary and Lower Hospital.

DENTAL SURGERY.

Licences to practise dentistry and to be registered are obtainable from the Royal College of Surgeons of England, of Edinburgh, and of Ireland, and from the Faculty of Physicians and Surgeons of Glasgow.

A large number of the medical teaching institutions provide special arrangements for dental students. A list of the majority of these is given on page xxii.

[1] Perpetual.

[2] Contain beds for Fever patients.

REGULATIONS OF THE GENERAL MEDICAL COUNCIL.

Candidates for a diploma in dental surgery shall produce certificates of having been engaged during four years in professional studies, and of having received three years' instruction in mechanical dentistry from a registered practitioner. One year's *bonâ fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted one of the four years of professional study. The three years of instruction in mechanical dentistry, or any part of them, may be taken by the dental student, either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

A register of dental students is kept by the Registrar of the General Medical Council, 299 Oxford Street, London.

Preliminary education.—Dental students are subject to the same regulations as regards preliminary education as medical students, but professional study may commence by pupilage with a registered dental practitioner.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Licence in Dental Surgery.

The following are the regulations:—

I. There is a Preliminary Science Examination and two Professional Examinations for the licence. The Preliminary Science Examination consists of chemistry, physics, and practical chemistry, and is identical with Part I. of the First Examination of the Examining Board in England for medicine. The First Professional Examination for the licence consists of mechanical dentistry and dental metallurgy; and the Second, general anatomy and physiology, general surgery and pathology, dental anatomy and physiology, dental pathology and surgery, and practical dental surgery.

Candidates will be required to show a general knowledge of the anatomy of the whole human body.

II. Candidates will be required to produce certificates of having received instruction, at an institution recognised for the purpose, in chemistry, physics, and practical chemistry, before entering for the Preliminary Science Examination.

⁂ This instruction may be taken prior to the date of registration as a dental student.

III. Candidates will be required to produce the following certificates before entering for the First Professional Examination, namely:—

1. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of mechanical dentistry, under the instruction of a competent practitioner, or under the direction of the superintendent of the mechanical department of a recognised dental hospital, where the arrangements for teaching mechanical dentistry are satisfactory to the Board of Examiners in Dental Surgery. In the case of qualified surgeons, evidence of a period of not less than two instead of three years of such instruction will be sufficient.

⁂ This instruction may be taken prior to the date of registration as a dental student.

2. Of registration as a dental student by the General Medical Council.

3. Of having attended at a recognised dental hospital and school:

(*a*) A course of lectures on dental metallurgy.

(*b*) A course of practical dental metallurgy.

(*c*) A course of lectures on dental mechanics.

(*d*) A course of practical dental mechanics, including the manufacture and adjustment of six dentures and six crowns.

IV. Candidates will be required to produce the following certificates before entering for the Second Professional Examination, namely:—

1. Of having been engaged during four years in the acquirement of professional knowledge, subsequently to the date of registration as a dental student.

2. Of having attended at a recognised dental hospital and school:

(*a*) A course of dental anatomy and physiology.

(*b*) A separate course of dental histology, including the preparation of microscopical sections.

(*c*) A course of dental surgery.

(*d*) A separate course of practical dental surgery.

(*e*) A course of not less than five lectures on the surgery of the mouth.*

(*f*) A course of dental bacteriology.

(*g*) A course of dental materia medica.

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* These lectures may be given either at a recognised dental hospital and school, in which case the lecturer must be a qualified surgeon practising surgery, or they may be given at a recognised medical school, and may form part of the course required by Clause 8 (*d*).

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3. Of having attended at a recognised dental hospital or in the dental department of a recognised general hospital, the practice of dental surgery during two years.

4. Of having attended at a recognised medical school:

(*a*) A course of lectures on anatomy.

(*b*) A course of lectures on physiology.

(*c*) A separate practical course of physiology.

(*d*) A course of lectures on surgery.

(*e*) A course of lectures on medicine.

5. Of having performed dissections at a recognised medical school during not less than twelve months.

6. Of having attended at a recognised hospital or hospitals, the practice of surgery and clinical lectures on surgery during two winter sessions.

7. Of being 21 years of age.

⁂ The certificates of professional study will be required to show that students have attended the courses of professional study to the satisfaction of their teachers.

V. Candidates may present themselves for the Preliminary Science Examination before entering at a dental school, on production of the certificates required under Section II. This examination will be identical with Part I. of the First Examination of the Examining Board in England.

VI. Candidates may present themselves for the First Professional Examination for the licence after the completion of six months' attendance at a recognised dental hospital and school, on production of the certificates required under Section III.

VII. Candidates may present themselves for the Second Professional Examination, on production of the certificates required under Section IV., after the completion of four years' professional study from the date of registration as a dental student, and after the lapse of not less than six months from the date of passing the First Professional Examination.

VIII. Synopses of the examination in chemistry, physics, and practical chemistry, and dental metallurgy, are issued with the regulations.

IX. The Preliminary Science Examination will be held in January, March or April, July and October in each year.

The First and Second Professional Examinations will be held in May and November in each year. Candidates are required to give twenty-one clear days' notice of their intention to present themselves for examination.

Special Exemptions.

A candidate who shall produce satisfactory evidence of having passed an examination for a degree in medicine, conducted at a university in the United Kingdom, in India, or in a British colony, on the subjects of the Preliminary Science Examination, will be exempt from that examination.

Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the examination in anatomy and physiology required for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in anatomy and physiology required for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in those subjects.

Candidates who are members of the college, or who have passed the examination in surgery of the Examining Board in England, or who shall produce evidence of having passed the examination in surgery for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in surgery for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in general surgery and pathology.

Fees to be paid by candidates, £21.

The Royal College of Surgeons of Edinburgh.

Licence in Dental Surgery.

The candidate must fulfil the conditions of the regulations of the General Medical Council (see above); and the regulations as to curriculum are generally the same as those of the Royal College of Surgeons of England.

Special Exceptions.

Candidates who have passed the corresponding examinations for the Triple Qualification will be exempt from the First Dental Examination, and will have the advantage of being admissible either to the Final Dental Examination or to the Final Examination for the Triple Qualification, or to both. But the First Dental Examination will not be held as equivalent to the Triple Examinations, and will admit to the Final Dental Examination only. Candidates who are licentiates of this college, or who may be registered medical practitioners, will require to produce certificates of attendance on the special subjects only, and will be examined in these only for the dental diploma. Any candidates who shall produce satisfactory evidence of having passed in any of the subjects of the First Dental Examination, before any dental or surgical licensing board recognised by the Royal College of Surgeons of Edinburgh, will be exempt from examination in such subject or subjects; but no examination will be recognised as giving exemption, unless it is coextensive in its scope with the examinations of this college, and is the only final examination on the subject or subjects required by the board at which it was passed.

Fees.—The fee for the diploma is £10, 10s. to those who began their studies before 1st October 1896; £15, 15s. to those who began after that date.

Faculty of Physicians and Surgeons of Glasgow.

The regulations as to certificates, curriculum, number of examinations, fees, and examinations are in effect similar to those of the Royal College of Surgeons of Edinburgh. There is special provision for candidates who intend to qualify both under the Medical and Dentists Act, and there is an examination in practical dentistry conducted in a dental hospital, and also a practical examination in mechanical dentistry.

The Royal College of Surgeons in Ireland.

Licence in Dentistry.

Candidates are required to pass three examinations, namely, Preliminary (in general education), Primary Dental, and Final Dental.

DENTAL TEACHING INSTITUTIONS.

London.

Dental Hospital of London and School of Dental Surgery, Leicester Square. Fee, £53, 3s. in one payment; or £55, 13s. in two instalments.

National Dental Hospital or College, Great Portland Street, W. Fee for necessary course, £42.

Guy's Hospital and London Hospital.

Provinces.

University of Birmingham. Composition fee, £73, 2s.

University of Liverpool.

University College, Bristol.

Durham University and Newcastle School of Medicine.

University College, Bristol.

University of Manchester. Composition fee for degree, 60 guineas; for diploma, 55 guineas.

Devon and Exeter Dental Hospital, Exeter.

University of Leeds.

Scotland.

Incorporated Edinburgh Dental Hospital and School. Minimum fee, £90, 7s.

Dental Hospital and School, Glasgow.

Dental Department, Royal Glasgow Infirmary.

Anderson's College, Glasgow.

Ireland.

School of the Royal College of Surgeons, Ireland.

Special composition fees are charged at several of the London hospitals for the classes required by dental students apart from those taken at a dental hospital. Thus, Charing Cross and Middlesex Hospitals, £56, 14s.; Westminster Hospital, £50; St. Thomas's, £65; St. George's, £50; King's College, hospital fee, two years, £25, 4s.; lectures, £15, 15s.

Names and Addresses of the Secretaries and Registrars of certain of the Medical Schools.

I. *Branch Registrars of the General Medical Council.*

England—Mr. H. E. Allen, B.A., LL.B., 299 Oxford Street, London, W.

Scotland—Mr. James Robertson, 54 George Square, Edinburgh.

Ireland—Mr. Richard J. E. Roe, 35 Dawson Street, Dublin.

II. *Secretaries and Registrars, etc., of Medical Bodies.*

The Secretary—English Conjoint Board, Victoria Embankment, London, W.C.

The Secretary—Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.

The Secretary—Apothecaries' Hall, Blackfriars, London, E.C.

The Secretary—University of Durham, College of Medicine, Newcastle-on-Tyne.

The Secretary—Royal College of Physicians, Edinburgh.

The Secretary—School of Medicine of the Royal Colleges, Edinburgh, 24 Forrest Road, Edinburgh.

The Secretary—Royal College of Surgeons, Edinburgh.

The Secretary—Anderson's College Medical School, Glasgow.

The Secretary—Educational Institute of Scotland, 40 Princes Street, Edinburgh.

The Secretary—Royal University of Ireland, Dublin.

The Registrar—Royal College of Physicians, Pall Mall East, London, S.W.

The Registrar—University of London, Burlington Gardens, London, W.

The Secretary—University of Birmingham.

The Dean of the Faculty of Medicine—In each of the Scotch Universities.

The Dean of the Faculty of Medicine—Victoria University, Owens College, Manchester.

The Secretary—Irish Conjoint Board, 6 Kildare Street, Dublin.

III. *Inspectors of Conjoint Examination in Scotland.*

Mr. James Robertson, 54 George Square, Edinburgh.
Mr. Alexander Duncan, B.A., 242 St. Vincent Street, Glasgow.

ARMY MEDICAL DEPARTMENT.

WAR OFFICE, LONDON.

Schedule of Qualifications necessary for Candidates desirous of obtaining Commissions in the Royal Army Medical Corps, with the Conditions of Service.

QUALIFICATIONS.

1. A candidate for a commission in the R.A.M.C. must be 21 years and not over 28 years of age at the date of commencement of the entrance examination. He will be required to complete the following forms:—

1. Name in full.
2. Address.
3. Date of birth.
4. Registrable qualifications.
5. Academic or other distinction.
6. Name of Dean or other responsible authority of the school in which the candidate completed his course as a medical student.
7. Particulars of any commission or appointment held in the public services.
8. Date of examination at which the candidate proposes to present himself.

[*N.B.*—Misstatements invalidate subsequent appointments, etc.]

The Dean of the candidate's medical school will be requested to furnish a confidential report anent the candidate—his character, conduct, ability, and fitness. If approved by the Director-General, he will then be allowed to compete; first being examined by a board of medical officers.

The medical examination includes height, weight, chest measurement, eyesight, hearing, speech, condition of teeth, of heart and lungs, rupture, varicocele, varicose veins, development of limbs, of feet and toes, of skin, congenital malformations, and constitution. If there is any doubt, the Board have to state whether candidate, in their opinion, is of pure European descent.

The Secretary of State reserves the right of rejecting any candidate who may show a deficiency in his general education, as evinced by bad spelling or composition.

An entrance fee of £1 is required from each candidate admitted to the competition, and is payable at the conclusion of his physical examination, if pronounced fit.

A candidate successful at the entrance examination will be appointed a lieutenant on probation, and will be required to pass through such courses of instruction as the Secretary of State shall decide, and, after passing the examinations in the subjects taught, and satisfying the Director-General that he possesses the necessary skill, knowledge, and character for permanent appointment to the Royal Army Medical Corps, his commission as lieutenant will be confirmed. The commission shall bear the date of the officer's appointment as lieutenant on probation.

Before the commission as a lieutenant on probation is confirmed, he must be registered under the Medical Acts in force in the United Kingdom at the time of his appointment.

The precedence of lieutenants among each other shall be in order of merit, as determined by the combined results of the entrance examination and the examinations undergone while on probation.

Lieutenants, when appointed on probation, will receive instructions as to the provision of uniform.

EXAMINATIONS.

Subjects for the Entrance Examination.

Candidates will be examined by the Examining Board in medicine and surgery. The examination will be of a clinical and practical character, partly written and partly oral, marks being allotted under the following scheme:—

MEDICINE (WRITTEN).	Maximum Marks.
A. Examination and report upon a medical case in the wards of a hospital	125
B. Commentary upon a case in medicine	125
(Three hours allowed for A and B together.)	
MEDICINE (ORAL).	
A. Clinical cases; clinical pathology	75
B. Morbid anatomy and morbid histology	75
(One quarter of an hour allowed for each table.)	
SURGERY (WRITTEN).	
A. Examination and report upon a surgical case in the wards of a hospital	125
B. Commentary upon a case in surgery	125
(Three hours allowed for A and B together.)	
SURGERY (ORAL).	
A. Clinical cases, including diseases of the eye; surgical instruments and appliances	75
(One quarter of an hour allowed for this table.)	
B. Operative surgery and surgical anatomy	75
Total marks	800

The following headings are published as a guide to candidates in drawing up their reports on cases:—

(*a*) A brief history of the case as given by the patient, including such points only (if any) in the family or personal history as have a distinct bearing upon the present illness or incapacity. (*b*) A detailed account of the subjective symptoms and physical signs elicited by the candidate's personal examination of the patient, noting the absence of any which might be expected to be present in a similar case. (*c*) Where there is any reasonable doubt in the mind of the candidate as to an exact diagnosis, he is to give the alternatives, with his reasons for making the selection. (*d*) A commentary upon the case as a whole, pointing out the symptoms which may be considered typical, and those which appear to be unusual or only accidental complications. (*e*) Suggestions as to treatment, both immediate and possibly necessary at a later date. (*f*) A forecast of the progress and probable termination of the case.

Similarly, the commentary on the report of a case submitted to the candidate should discuss:—

(*a*) The family and personal history and other conditions preceding the development of the condition described. (*b*) The relative significance of the physical signs, symptoms, other indications of disease noted, and the general clinical aspects of the case. (*c*) The diagnosis, with reasons for selection of the most probable, when a positive diagnosis cannot be attained. (*d*) The treatment, dietetic, medicinal, operative, etc., including a criticism of the plan adopted, and alternative schemes of treatment in case of disagreement. (*e*) The morbid appearances and an account of the post-mortem examination (if any).

The examination will be held in London, and will occupy about four days.

The appointments announced for the competition will be filled up from the list of qualified candidates, arranged in the order of merit, as determined by the total number of marks each has obtained. Having gained a place in this entrance examination, the successful candidates will undergo two months' instruction in hygiene and bacteriology, after which they will be examined in these subjects. The maximum number of marks obtainable at this examination will be 100. It has been determined that this course shall be delivered in London, and not as heretofore at Netley.

On completion of the above course, lieutenants on probation will be ordered to proceed to the depôt of the Royal Army Medical Corps at Aldershot for a three months' course of instruction in the technical duties of the corps, and at the end of the course will be examined in the subjects taught. The maximum number of marks obtainable at this examination will be 100. A lieutenant on probation who fails to qualify in either of these examinations will be allowed a second trial, and, should he qualify, will be placed at the bottom of the list. Should he again fail in either examination, his commission will not be confirmed.

Extracts from the Royal Warrant for Pay and Promotion, 1894, *as amended by Royal Warrant of* 18*th September* 1894, *and from the Regulations for Army Medical Services*, 1902.

PAY.

The pay of the officers of the R.A.M.C. shall be at the following rates:—

AT HEADQUARTERS.	Inclusive of all Allowances except Field and Travelling Allowances (Yearly).
Director-general	£2000 0 0
Deputy director-general	1500 0 0
Assistant director-general	850 0 0
Deputy assistant director-general	750 0 0

At Other Stations.	Excl. of Allowances (Daily).
Surgeon-general	£3 0 0
Colonel	2 0 0
Lieutenant-colonel	1 10 0
Lieutenant-colonel specially selected for increased pay after at least 8 years' service abroad	1 15 0
Major	1 3 6
After 3 years as such	1 6 0
Captain	0 15 6
After 7 years' total full-pay service	0 17 0
,, 10 years' total full-pay service	1 1 0
Lieutenant on probation and lieutenant	0 14 0
Adjutant of the Royal Army Medical Corps (Volunteers)	The Pay of his Rank.

Retired Pay.

An officer of our Medical Staff, after completing ten years' service on full pay, may be permitted to retire from our army with retired pay or gratuity, according to the scale laid down in Art. 1071, if such voluntary retirement be specially recommended by our Commander-in-Chief, and approved by our Secretary of State.

The appointment of Director-General of the Army Medical Department shall be for seven years, and the retirement of the other officers of our Army Medical Staff shall be compulsory at the following ages, except that, if it should in any particular case be considered desirable in the interests of the public service, the age for the retirement of a surgeon-general may be extended for a period not exceeding two years—surgeon-general, 60 years; surgeon-colonel, 57 years: and other officers, 55 years.

Scale of Retired Pay.

	Yearly.
Director-general after three years' service in the appointment (with 30 years' service)	£1125 0 0
Under 3 years' service as Director-general and after not less than 30 years' service	875 0 0
	Daily.
Surgeon-general	£2 0 0
Colonel, R.A.M.C., and surgeon-colonel, Household Troops	1 15 0
Lieutenant-colonel, R.A.M.C., and surgeon-lieutenant-colonel, Household Troops :—	
After 20 years' service	1 0 0
,, 25 ,,	1 2 0
,, 30 ,,	1 5 0
Lieutenant-colonel, after having been in receipt of the increased pay (5s. a day additional) for 3 years, or a brigade surgeon-lieutenant-colonel of the Household Troops :—	
Under 30 years' service	1 7 6
After 30 ,,	1 10 0
Major, or surgeon-major of the Household Troops :—	
After 20 years' service	1 0 0
,, 25 years' service, if his service reckoning for promotion is insufficient to qualify him for promotion to the rank of lieutenant-colonel under Article 351	1 2 6

	Gratuity.
Major or captain :—	
After 5 years' service in the rank of captain . . .	£1000 0 0
,, 3 ,, ,, major . . .	1800 0 0
,, 6 ,, ,, ,, . . .	2500 0 0
Surgeon-lieutenant-colonel or surgeon-major of the Household Troops :—	
After 15 years' service	1800 0 0
,, 18 ,, ...	2500 0 0

Except in the case of a lieutenant-colonel, an officer of the Army Medical Service, who, on voluntary retirement, has served for less than three years in the rank from which he retires, shall be entitled only to the gratuity or retired pay assigned to the next lower rank.

PROMOTION.

Every promotion of a medical or departmental officer shall be given upon the recommendation of the Commander-in-Chief, with the approval of the Secretary of State. Promotion by selection shall be given on the ground of ability and merit, due consideration being given, however, to length of efficient service.

An officer shall be eligible for promotion to the rank of captain on the completion of three and a half years' service, and to the rank of major on the completion of twelve years' service, provided that, in each case, he has previously qualified in such manner as may be prescribed by the Secretary of State.

Promotion to the rank of lieutenant-colonel shall be made by selection from officers who have completed at least twenty years' service, and have qualified in such manner as may be prescribed by the Secretary of State.

If an officer has passed with distinction the examination qualifying for promotion to the rank of major, the period of service required to render him eligible for the rank of major or lieutenant-colonel may be reduced as follows:—

	Months.
If he obtained a "special certificate"	18
,, passed in the 1st Class	12
,, ,, ,, 2nd ,, ...	6
,, ,, ,, 3rd ,, ...	3

Promotion to the rank of colonel shall be made by selection from lieutenant-colonels who have been specially selected for increased pay and from lieutenant-colonels or surgeon-lieutenant-colonels of the Household Troops specially recommended to the Secretary of State for distinguished service in the field. Promotion to the rank of surgeon-general shall be made by selection from colonels. A colonel may also be promoted to the rank of surgeon-general, for distinguished service in the field. In cases of distinguished service in the field a departmental officer may, with the concurrence of the Lords Commissioners of the Treasury, be promoted from any rank or class to the next above it, and shall, if promoted to a rank or class having a fixed establishment, remain supernumerary in such rank or class until the occurrence of the vacancy to which in the ordinary course he would have been promoted. An officer of the Royal Army Medical Corps is eligible for promotion to brevet rank. A captain after at least six years' service, a major or lieutenant-colonel, may be promoted to the next higher rank by brevet, for distinguished service in the field or for distinguished service of an exceptional nature other than in the field. If the officer dies before the date on which the notification of his promotion for distinguished service in the field appears in the *London Gazette*, the promotion shall bear the date which it would have borne had the officer not died. Distinction in original investigation or research may, in the case of officers of the Royal Army Medical Corps, be regarded as "distinguished service of an exceptional nature other than in the field." An officer who does not qualify for promotion to the rank of captain or major within the periods specified, shall be placed on the supernumerary list until he qualifies or is retired from the service. Service on the supernumerary list shall not reckon towards promotion, increase of pay, gratuity, or pension.

Examinations for Promotion in the Royal Army Medical Corps.

Lieutenant before promotion to captain.—(For lieutenants appointed after March 31, 1901.) This examination may be taken at any time after completing 18 months' service, and will be held in the military district in which the officer is serving. The subjects of this examination, which are detailed in the King's Regulations, are as follows:—

(1) Regimental duties; (2) drill; (3) military law; (4) duties and accounts connected with military hospitals and their supplies; and (5) other duties of executive medical officers.

Captain before promotion to major.—(For captains promoted to that rank after July 27, 1895.) Captains will be examined under the rules laid down in Paragraph 24, and will be eligible for acceleration in their promotion to the rank of major, under Article 352 of the Royal Warrant.

This examination, which may be taken at any time after completing five years' service, will be held in London on the termination of a period of special study. The examination will consist of written papers, essays, oral and practical examinations in the following subjects, which are detailed in the King's Regulations:—

(1) Medicine; (2) surgery; (3) hygiene; (4) bacteriology and tropical disease; and (5) one special subject, from the subjoined list, to which additions may from time to time be made—(*a*) bacteriology, including the preparation of antitoxine; (*b*) dental surgery; (*c*) dermatology; (*d*) laryngology; (*e*) midwifery and gynæcology; (*f*) operative surgery, advanced; (*g*) ophthalmology; (*h*) otology; (*i*) pediatrics; (*k*) psychological medicine; (*l*) skiagraphy; and (*m*) specific fevers.

Captains serving in that rank before July 27, 1895, will be promoted under the old regulations contained in Appendix I., Regulations for Army Medical Services, and will not be eligible for acceleration.

Majors before promotion to lieutenant-colonel (for majors promoted to the rank after March 31, 1895).—This examination, which may be taken at any time after three years in the rank of major, will be held in the military district in which the officer is serving, at times which will be duly notified. The subjects of this examination, which are detailed in the King's Regulations, are as follows:—

(1) Military law; (2) army medical organisation; (3) sanitation of towns, camps, transports, etc.; (4) epidemiology and the management of epidemics; (5) one special subject from the subjoined list to which additions may from time to time be made—(*a*) medical history of important campaigns; (*b*) a general knowledge of the Army Medical Services of other Powers; and (*c*) the laws and customs of war in relation to the sick and wounded.

The questions and answers will be forwarded, under a sealed confidential cover, to the Director-General of the Army Medical Department, for transmission to the examiners, who will report to the Director-General as to the competence of the officer examined.

INDIAN MEDICAL SERVICE.

The regulations for the examination of candidates for admission to His Majesty's Indian Medical Service differ only slightly from those of the home service. The declarations are sent to the Military Secretary, India Office, Westminster.

The physical fitness of each candidate will be determined previous to examination by a board of medical officers, who are required to certify that his vision is sufficiently good to enable him to perform any surgical operation without the aid of glasses. Further particulars as to the standard of eyesight will be found in a pamphlet by Sir J. Fayrer, M.D., K.C.S.I., entitled "Regulations as to Defects of Vision," published by Messrs. J. & A. Churchill, 7 Great Marlborough Street, W. A moderate degree of myopia will not be considered a disqualification, provided it does not necessitate the use of glasses during the performance of operations, and that no organic disease of the eyes exists. Every candidate must also be free from all other organic disease, and from constitutional weakness, or other disability likely to unfit him for military service in India. Candidates who pass the Medical Board Examination will be required to pay a fee of £1 before being permitted to compete.

On producing the foregoing qualifications, the candidate will be examined by the Examining Board in the following subjects, and the highest number of marks attainable will be distributed as follows:—

	Marks.
1. Medicine, including therapeutics	1200
2. Surgery, including diseases of the eye	1200
3. Surgical anatomy and physiology	600
4. Pathology and bacteriology	600
5. Midwifery and diseases of women and children	600
6. Chemistry and pharmacy, with either botany or zoology	600

After passing this examination, the successful candidates are required to attend a four months' course of practical work at the Army Medical School or elsewhere, as may be decided, in (1) hygiene, (2) military and tropical medicine, (3) pathology of diseases and injuries incidental to military and tropical service, (4) military surgery.

During this course candidates receive an allowance of 14s. per day.

At the conclusion of the course, and after the leaving examination, the position of the candidates on the list of surgeon-lieutenants will be determined by the combined results of the Preliminary and Final Examinations, and, so far as the requirements of the service will permit, they will have the choice of commands in India (*i.e.* Bengal, Punjab, Madras, or Bombay) according to their position in that list.

Officers appointed to the Indian Medical Service will be placed on one list. Though ordinarily employed within the limits of the command to which they may have been posted, they will be liable to employment in any part of India, according to the exigencies of the service.

No candidate will be permitted to compete more than three times.

Examinations for admission to the service usually take place twice in the year, *i.e.* in February and August.

The examiners in London will prepare a list in order of merit, with the marks affixed in the different subjects, to be transmitted to the Director-General and communicated to the professors of the Army Medical School. If any candidate is found to be deficient in any particular subject, this shall be stated, in order that he may receive special instruction on the point at Netley.

PAY AND ALLOWANCE.

The following are the rates of "Indian pay and allowances" which will be drawn by officers hereafter appointed to the Indian Medical Service:—

Rank.	Years' Service.	Indian Pay and Allowances per mensem. When not holding an appointment carrying higher pay.
		Rs.
Lieutenant-colonel specially selected for increased pay		1000
Lieutenant-colonel	25 and over	900
,, ,,		900
Major	15 ,,	750
,,		650

Rank	Years' Service.	*A.* When not receiving any Staff Allowance.	*B.* When receiving Staff Allowance in addition.
		Rs.	Rs.
Captain	10 and over	550	500
,,	5 ,,	450	400
Captain	under 5	400	350
Lieutenant		350	300

On first appointment they will only come into receipt of "Indian pay and allowances" (Column *A*) from the date of their arrival in India.

Officers holding the principal administrative appointments and substantive military charges of the Indian Medical Service, receive at present the following consolidated salaries:—

	Rs. per mensem.
Surgeon-general	2200 to 3000
Colonel from	1800
to	2250
Lieutenant-colonel of twenty years' service and upwards	1100 with Rs. 90 horse allowance in cavalry regiments.
Lieutenant-colonel, in substantive charge of a native regiment	1250 with Rs. 90 do.
Major, under twenty years' service, in substantive charge of a native regiment	900 with Rs. 90 do.
Captain, above five years' full pay service, in substantive charge of a native regiment	600 with Rs. 60 do.
Captain, or lieutenant under five years' do., in substantive charge of a native regiment	500 with Rs. 60 do.

The salaries of other substantive medical appointments in the civil and military departments are consolidated, and vary from Rs. 2000 to Rs. 450 per mensem.

LEAVE RULES.

Officers of the Indian Medical Service, below the rank of surgeon-colonel, may be granted—(1) Privilege leave, under such regulations as may from time to time be in force; (2) leave out of India, for no longer period than one year, capable of extension to two years' absence from duty, on the following pay:—

After arrival in India, on first appointment	£250 a year.
After the commencement of the 5th year's service for pension	250 ,,
Do. do. 10th do.	300 ,,
Do. do. 15th do.	450 ,,
Do. do. 20th do.	600 ,,
Do. do. 25th do.	700 ,,

(3) Leave in India, but for the period of one year only, on full military pay and half the staff salary of appointment.

RETIRING PENSIONS AND HALF-PAY.

Officers of the Indian Medical Service will be allowed to retire on the following scale of pension, on completion of the required periods of service :—

After 30 years' service for pension	£700 per annum.
,, 25 ,, ,, ...	500 ,,
,, 20 ,, ,, ...	400 ,,
,, 17 ,, ,, ...	300 ,,

Officers placed on temporary or permanent half-pay are granted half-pay at the following rates :—

	Rates of Half-pay.				
	Per diem.		Per annum.		
	s.	d.	£	s.	d.
Under 5 years' service	6	0	109	10	0
After 5 ,, ...	8	0	146	0	0
,, 10 ,, ...	10	0	182	10	0
,, 15 ,, ...	13	6	246	7	6

Officers cannot retire *in India* on half-pay (No. 45, 28th February 1865).

NAVY MEDICAL DEPARTMENT.

The regulations for this service correspond very closely to those for the army, with the following exceptions :—

The candidate must also declare his readiness to engage for general service at home or abroad as required.

The official requirements in the natural sciences are as follows :—

Zoology.—The examination in zoology will include the general principles of biology and a comparison of animals with plants ; the distinctive characters of the larger group of animals—the protozoa, cœlenterata, vermes, arthropoda, mollusca, echinodermata, and vertebrata—as illustrated by common types ; the elements of embryology ; animal parasites.

Botany.—The general principles of the morphology and physiology of low forms of life, for example, torula, bacteria, spirogyra, moss, fern ; the general morphology of flowering plants ; diagnosis of the important British natural orders ; medicinal plants.

Physics.—The general principles of mathematics, acoustics, optics, heat, magnetism and electricity, as : the property of solids, liquids, and gases ; conservation of energy, specific gravity, propagation and reflection of sound and light, temperature, specific and latent heat, thermometers, properties of mirrors and lenses, chromatic dispersion of light, forms of batteries, galvanic and frictional electricity, general properties of magnets.

Physical geography.—The relation of the earth to the rest of the solar system, nature of the earth's crust ; the chief kinds of rocks ; general configuration of land and water, mountains, plains, lakes, rivers, islands, glaciers and icebergs ; the ocean currents, tides, the earth's atmosphere, winds and storms, dew, rain, climate, volcanoes, earthquakes, general distribution of animal and vegetable life.

Successful candidates, immediately after passing the examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in naval hygiene, etc., at Haslar Hospital.

PAY AND RANK.

Rank.	Daily. £	s.	d.	Yearly. £	s.	d.
Surgeon—on entry	0	14	0	255	10	0
,, after 4 years' full-pay service	0	17	0	310	5	0
Staff-surgeon (or surgeon over 8 years)—on promotion	1	0	0	365	0	0
,, after 4 years' full-pay service in rank	1	4	0	438	0	0
Fleet-surgeon—on promotion	1	7	0	492	15	0
,, after 4 years' full-pay service in rank	1	10	0	547	10	0
,, ,, 8 ,, ,,	1	13	0	602	5	0
,, ,, 12 ,, ,,	1	16	0	657	0	0
Deputy inspector-general	2	2	0	766	10	0
Inspector-general	...			1300	0	0

On first appointment to the service, medical officers will receive full pay from date of appointment, but subject to the provisions of Art. 1342, Clause 2, of the Queen's Regulations, 1893.

The allowance of 5s. a day, in addition to full pay, at present granted to the fleet-surgeon of a flag ship, bearing the flag of a commander-in-chief on a foreign station, will be given to the senior medical officer, being a fleet- or staff-surgeon, and an allowance of 2s. 6d. a day to the senior medical officer, being a fleet- or staff-surgeon, of the ship of a commodore, or of a senior officer commanding a foreign station.

Medical officers conducting the course of instruction at Haslar Hospital will receive the following allowances:—

The senior officer employed upon this duty	£150 a year.
The junior officers assisting	50 a year.

The hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and light, are as follow:—

	At Home.	Abroad.
Deputy inspectors-general	£67	£112
Fleet-surgeons and staff-surgeons	53	112
Surgeons	39	108

Medical officers serving afloat receive an allowance of 1s. 6d. a day in lieu of provisions, fuel and lights, as laid down in the King's Regulations. The travelling allowances, extra pay, lodging money, and compensation for losses, are fixed for naval medical officers according to their relative rank in the service.

HALF-PAY.

The undermentioned scale of half-pay is substituted for that hitherto in force:—

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—under 2 years' full-pay service	0	6	0	109	10	0
,, after 2 years' full-pay service	0	7	0	127	15	0
,, ,, 4 ,, ,,	0	8	0	146	0	0
,, ,, 6 ,, ,,	0	9	0	164	5	0
Staff-surgeon (or surgeon over 8 years)—on promotion	0	10	0	182	10	0
,, after 2 years' full-pay service in rank	0	11	0	200	15	0
,, ,, 4 ,, ,,	0	12	0	219	0	0
,, ,, 6 ,, ,,	0	13	0	237	5	0
Fleet-surgeon—on promotion	0	14	0	255	10	0
,, after 2 years' full-pay service in rank	0	15	0	273	15	0
,, ,, 4 ,, ,,	0	17	0	310	5	0
,, ,, 6 ,, ,,	0	18	0	328	10	0
,, ,, 8 ,, ,,	0	19	0	346	15	0
,, ,, 10 ,, ,,	1	0	0	365	0	0
Deputy inspector-general—on promotion	1	5	0	456	5	0
,, after 2 years' full-pay service in rank	1	7	0	492	15	0
,, ,, 4 ,, ,,	1	9	0	529	5	0
Inspector-general	1	18	0	693	10	0

PRISON MEDICAL SERVICE.

This branch presents limited opportunities, either for entrance, or for subsequent advancement. The smaller prisons are officered, as a rule, by local practitioners. The medical officers to the larger prisons are appointed by the Convict Prison Board, or the Prison Commission. Special forms may be obtained from the secretary of the latter at the Home Office, on which applications are to be made. In the Convict Service there are eight posts, with salaries ranging from £250 to £550: in the Local Prison Service twenty-eight officers, with salaries from £250 to £500.

COLONIAL SERVICES.

Applicants for posts under the Colonial Office must be between the ages of 23 and 30, be doubly qualified, and preferably have held hospital appointments. The usual certificates require to be shown, and an official medical examination undergone. Applications for posts or for information are to be sent to the assistant-secretary, Colonial Office. As a rule, about twelve to fifteen vacancies occur annually. In addition to these, a number of semi-official appointments are made yearly by this office, in connection with public works, etc., in the Colonies.

PRACTITIONERS ABROAD.

In the majority of the British Colonies local registration of legal British qualification suffices to allow a practitioner to pursue the duties of his profession. Only in two (cf. Table VII.)

is this unnecessary; while in one, Ontario, a local diploma must be gained after examination.

A certain number of medical appointments in various Protectorates and Legations are also held under the Foreign Office. Information may be obtained from the Assistant Secretary, Foreign Office.

Few of the foreign nations allow British registered practitioners to practise, unless they first pass the State examinations. Table VII. gives a tabular view of the different regulations current:—

TABLE VII. COLONIES AND COUNTRIES IN WHICH DULY REGISTERED BRITISH GRADUATES AND DIPLOMATES CAN PRACTISE.

1. Without Compulsory Local Registration.

New South Wales, South Australia, Italy (only among visitors and aliens).

2. (*a*) After Local Registration.

Victoria, Tasmania, Queensland, New Zealand (£1, 5s. fee); Western Australia, Natal[1] (£1, 1s. to £3, 3s.); Cape Colony (£5 fee); Prince Edward Island ($20); New Brunswick ($1 to $2 a year); Nova Scotia, Quebec, Manitoba, North-West Territories ($50, and $1 to $2 a year); British Columbia, Jamaica, Klondyke ($50 fee); British Guiana, Fiji, Gold Coast, Gibraltar, Leeward and Virgin Islands, Monaco; Japan (6s.).

(*b*) After Application for Permission.

Belgium, Greece (examination in French or English); Italy.

3. Only after Examination.

State examination.—Austria, Denmark, Holland, Germany, Greece, Portugal, Roumania (*vivâ voce*), Russia, Norway, Spain, Sweden, Switzerland, Brazil (in French or Portuguese).

University or local examinations.—France, Turkey (£4, 10s. fee); Argentine (in Spanish); Chili (*vivâ voce*); Peru (*vivâ voce*); Uruguay (*vivâ voce*); Ontario.

4. America.

Twenty-four States require the passing of an examination; seventeen States require the same, or approval of the diploma presented by the applicant; and in nine, presentation of the diploma or degree is sufficient. The last nine are—

Alaska Territory, District of Columbia, Michigan, Arkansas, Kansas, Ohio, Arizona Territory, Nevada, Wyoming.

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[1] Annual licence also of £5.

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